Coal Age

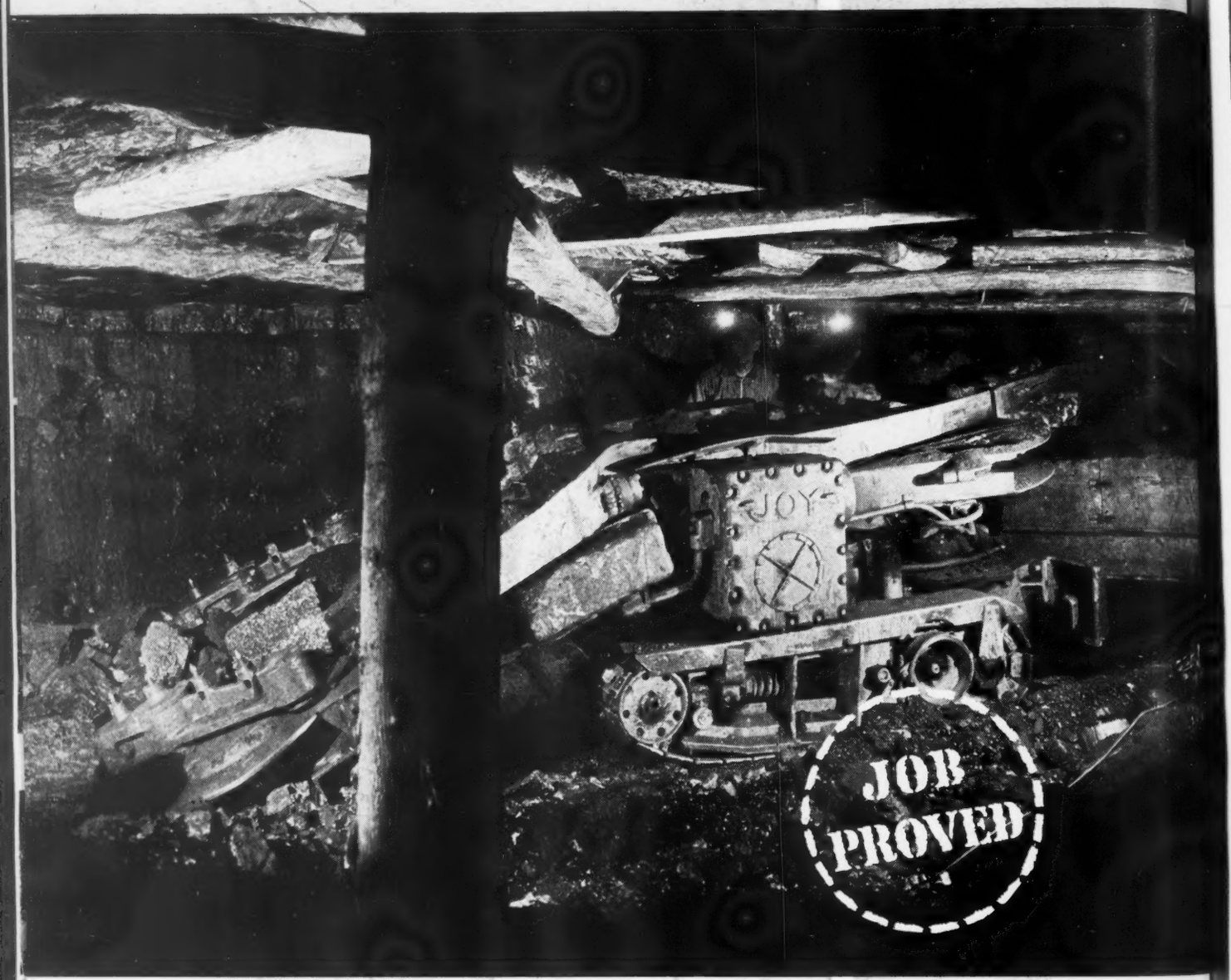
A McGRAW-HILL PUBLICATION

JUNE, 1947



L AND WELFARE .... p. 74

A Clean Saving of $1664



SUN MINE LUBRICANT...

Ends Gummy Condition in Joy Loaders, Eliminates Need for Cleaning Machines Every 2 or 3 Days

A Pennsylvania mine was loading coal under severe moisture conditions with Joy Loading Machines. Mine water reacted with the greases being used and caused them to separate and gum. This necessitated complete cleaning of the transmission case and gathering heads every two or three days if breakdowns were to be avoided.

A Sun Engineer was consulted and after careful study of the conditions, he recommended a specially prepared Sun Mine Lubricant.

When this Sun Lubricant was used the old gummy conditions disappeared. The Sun grease lasts six times as long, and now the machines have to be cleaned only every two or three weeks. Management has estimated the annual savings at $1664.

This case is typical of the performance that can be expected with Sun "Job Proved" lubricants. For the help of the Sun Engineer in keeping costs down and mine equipment operating steadily, call your nearest Sun office today. Or write Department CA-6.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

In Canada: Sun Oil Company, Ltd.—Toronto and Montreal

SUN

SUNOCO

INDUSTRIAL PRODUCTS



It soaked up the shock of 10 million crashing tons

A typical example of B. F. Goodrich product development

IT WAS only a 390 foot haul — but it proved to be a costly one. Huge hunks of coal had to be carried from a railroad siding to a barge dock on the river bank below. A belt conveyor system was the obvious answer. So one was built and put into service.

Everything was fine—until the belt wore out before it had carried 4 million tons. Now that much coal will heat a lot of houses. But it wasn't enough to make the belt a good investment. The second belt was even worse —just over 3 million. And the third one, which went 5½ million tons, still added too much to the cost of the coal.

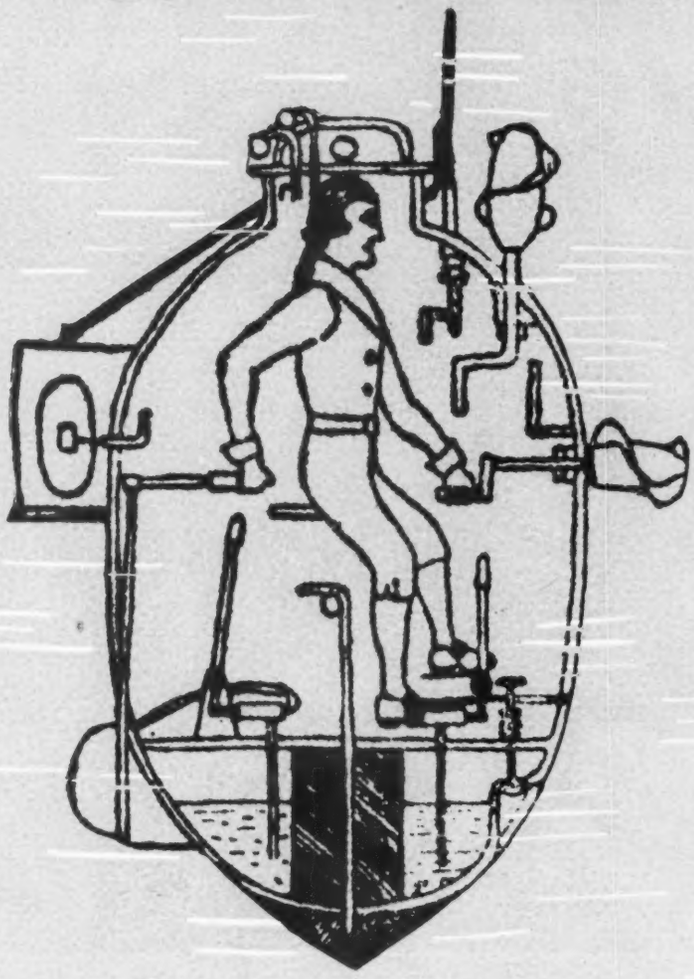
Then the coal company—and the mining industry—got a break. B.F. Goodrich belting engineers developed a new kind of belt in which hundreds of individual cords—each completely embedded in rubber — replaced the usual stiff fabric "carcass." They added a top ply with the cords running across the belt. When heavy hunks of material hit the belt it "gives" in both directions—absorbs the shock instead of fighting it. One of these cord belts was installed to carry the coal to the barge dock. Up to now it has handled *over 10 million tons and is still in service.*

No one knows yet just how much the cord belt will reduce handling costs for this company. But there are records of other cord belts which have lasted *10 times as long* as conventional belts—each one a typical example of the results of B.F.Goodrich research and product development. *The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

First in its Field....



Ezra nearly got his battleship . . .
in THE FIRST SUBMARINE

Sergeant Ezra Lee certainly didn't breathe easily when in 1777 he submerged in the "Turtle," built by David Bushnell of Saybrooke, Connecticut. It could stay under 30 minutes without a fresh supply of air, and its operating arrangements were of the simplest. However, Ezra succeeded in fastening a charge of explosives to the hull of the British battleship "Eagle" in New York Harbor, during the Revolutionary War, and the explosion nearly sank the vessel.

You can breathe easily when you use HULBURT QUALITY GREASE—backed by HULBURT down-in-the-mine Engineering Service — to lubricate your coal mining machinery. If you want your coal mining machinery to stay on the job for longer periods, without lubrication troubles, to stay down getting out the coal and not in the repair shop, the simplest way to satisfactory operation is—HULBURT QUALITY GREASE.

HULBURT OIL & GREASE COMPANY — PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

...a record of

American Leadership



HULBURT *Quality* GREASE

THE "FIRST NAME" IN



Special cable to meet special service requirements — that's usually a pretty safe rule to follow. But every good rule has an exception sometimes and, such an exception is Hazasheath.

Tinned copper conductors are first protected with a strong, resilient wall of moisture-resistant Submarine insulation. Over this conductor insulation goes tightly wound protective tapes. And then to give this cable its installation versatility, the outer sheath is a thick jacket of Hazaprene, compounded with neoprene, and mold cured under heavy pressure. This Hazasheath jacket resists oil, sunlight, acids, moisture, chemicals and mechanical damage. It has all the necessary protection for aerial, underground or conduit service built in . . . makes cable installation simple, fast and economical. For complete details, see your Hazard representative or write for Hazasheath Bulletin 322. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

5165

HAZARD

insulated wires and cables for every mining use

Coal Age

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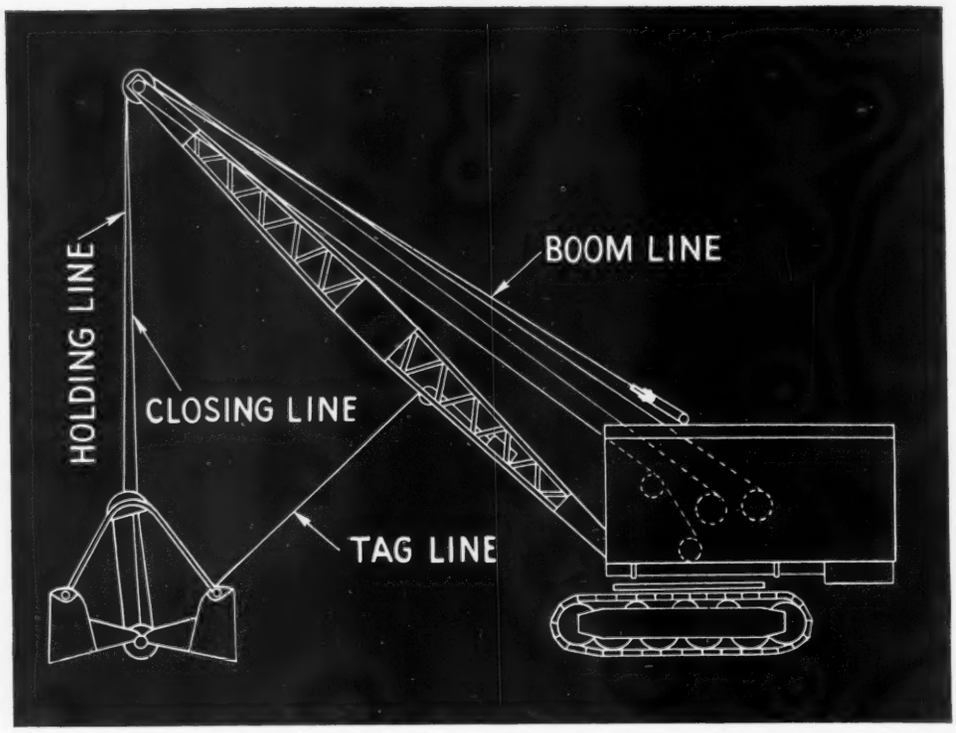
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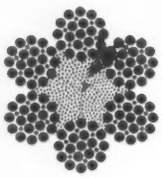
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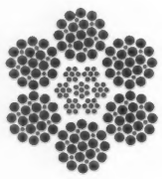
New Title or Position . . . . . .



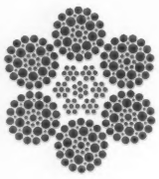
Follow this guide in buying Ropes for Clamshell Cranes



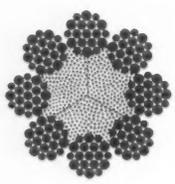
TYPE W
fiber core



TYPE W
independent
wire rope core



6 x 37 TYPE Q
independent
wire rope core



8 x 19 WARRINGTON
fiber core

Each rope on a clamshell crane has a specialized job, and your choice of lines has a direct bearing on rope life and performance. Bethlehem suggests that you use the following as a guide when considering wire rope for clamshells.

HOLDING LINES encounter relatively little wear or crushing. Bethlehem's 6 x 19 Type W Purple Strand with regular lay and fiber core is widely used. Form-Set (preformed) often specified.

CLOSING LINES are often subjected to severe bending and crushing. Good ropes for this service are the 6 x 19 Type W and the 6 x 37, choice depending upon the type of bucket. To help resist crushing, independent wire rope core may be required. We recommend Purple Strand grade, regular lay, Form-Set (preformed).

BOOM LINES are rarely subject to heavy wear. A Purple Strand 6 x 19 Type W rope, regular lay, will do a good job for you here. A fiber core is often used, but independent wire rope core gives added protection against crushing.

TAG LINES need unusual flexibility and elasticity. Generally plow steel rope with regular lay and fiber core is used. 8 x 19 is suggested for small cranes; 6 x 19 Type W for large ones.

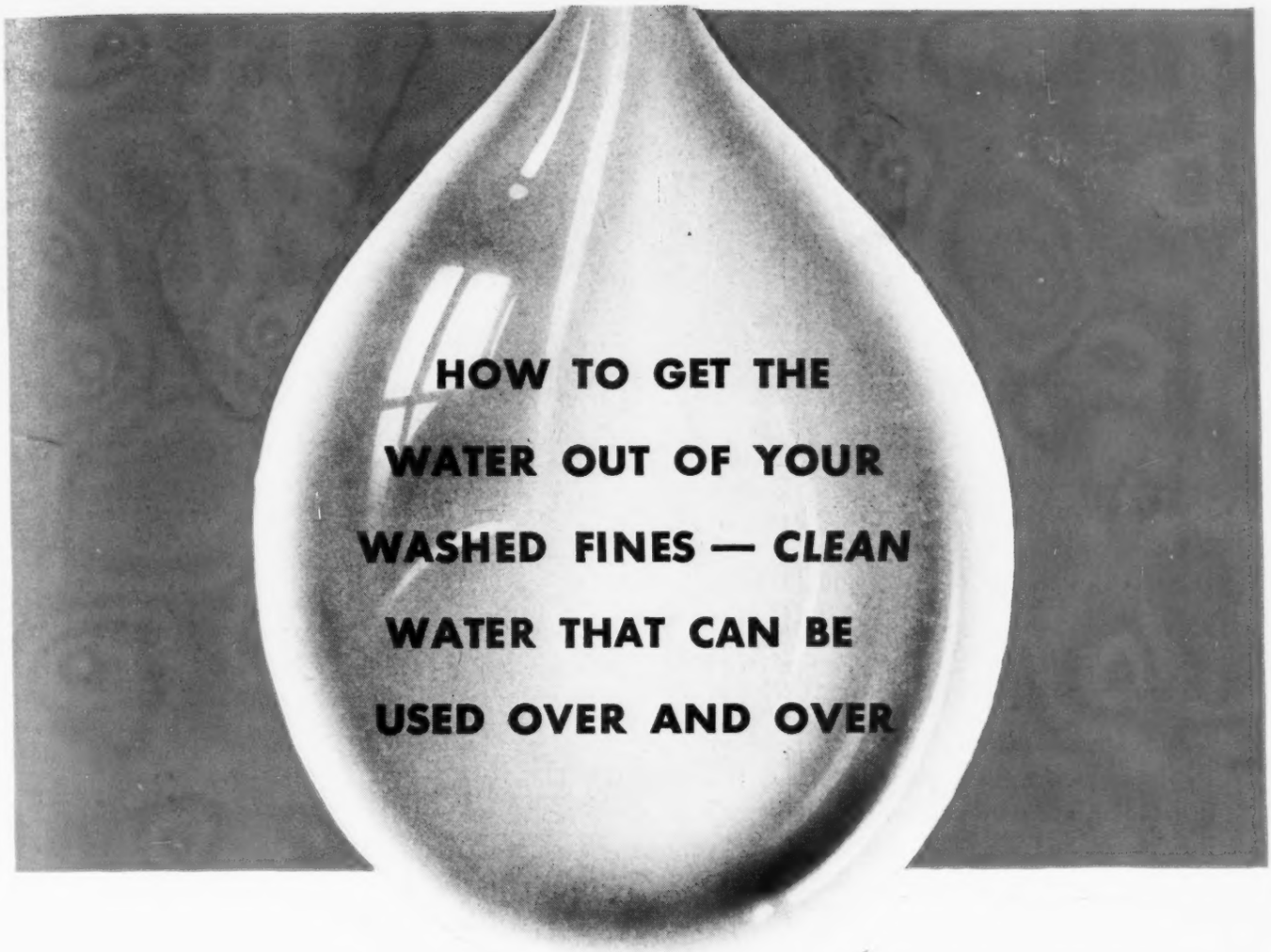
If further details are required, ask for the services of a Bethlehem engineer. He'll be glad to help with your wire-rope problems, at no cost to you.

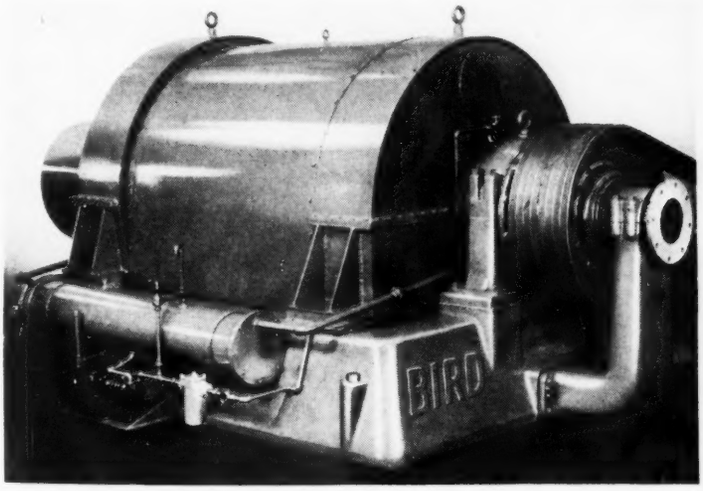
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation



When you think WIRE ROPE . . . think BETHLEHEM





The Bird Continuous Centrifugal Filter has already proved that it can do this job better and at lower cost, whatever the type of washing system used.

The BIRD dries fine coal so dry it's just right for blending.

The BIRD turns out forty tons or more per hour. Over-all operating cost is extraordinarily low, for it runs continuously without attention and without parts replacements.

BIRD MACHINE COMPANY, South Walpole, Mass.

The BIRD Continuous Centrifugal FILTER

"THIS PUMP SET 11-YEAR Dewatering

In operation almost continuously since 1936, this A-C mine pump has required no major repairs

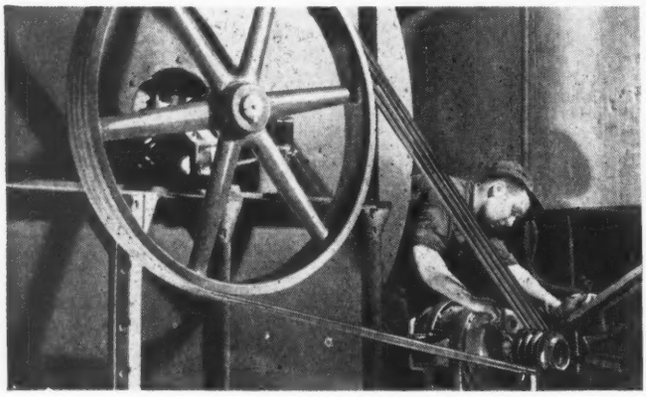
THINK WHAT THAT MEANS in savings of downtime and maintenance! Not only that — for these 11 years this all-bronze 9,000 gpm, 360 ft head single-stage pump has maintained its high efficiency . . . has effectively kept water from workings in a large coal mine.

Such a record can only be the result of sound equipment design, based on years of experience in building not only pumps, but coal processing, power and electrical equipment as well. Yes, you'll get top performance and year-after-year dependability of equipment when you buy from Allis-Chalmers.

You'll get real help, too, in getting lower operating costs and better tonnages. For Allis-Chalmers offers you sound, *unbiased* equipment recommendations . . . based on the requirements of *your* specific job.

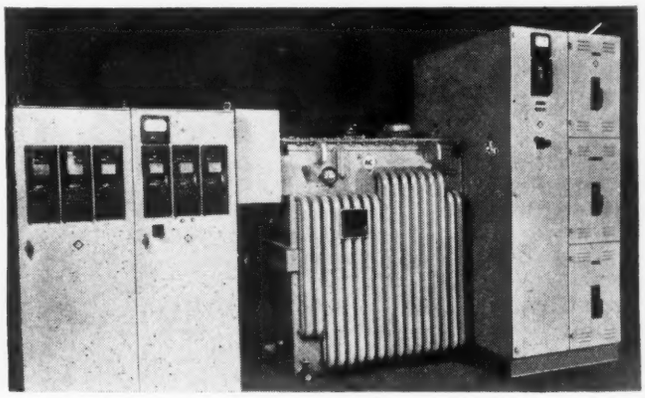
Skilled engineers — coal industry specialists — are available now to help you plan tomorrow's equipment needs. Call your nearby A-C office. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2169



POWER TRANSMISSION

SUBSTANTIAL SAVINGS IN VENTILATION COSTS are possible with ample airways and modern fans, Allis-Chalmers motors and Texrope V-belt drives. Efficient Texrope drives provide speed ratios of 7:1 . . . permit use of lower cost higher speed motors. Exclusive duplex-sealed belt cover offers maximum V-belt durability in dusty, gritty locations. Texrope drives are shock-absorbing . . . protect bearings of both motor and fan. Belts available in Static-Resisting, Oil-Resisting, Oil-Proof types. **Send for Bulletin B6051G.**



POWER DISTRIBUTION

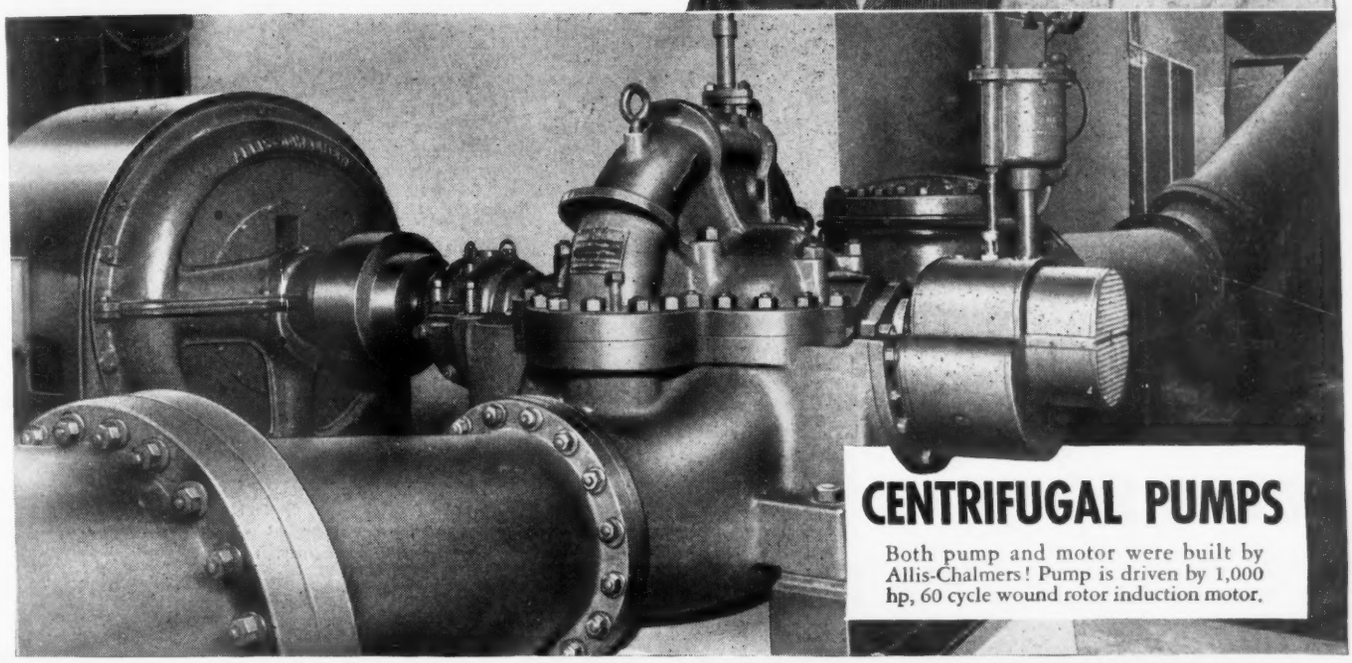
BETTER VOLTAGE REGULATION and reduction of line loss and cable costs may be obtained with modern Allis-Chalmers metal-enclosed Unit Substations. Built for maximum safety . . . with no live parts exposed . . . these versatile units are available in combinations of switchgear and transformer elements to suit *any* installation requirement. Unit substations save power costs and increase efficiencies by bringing high voltages closer to load centers. Sizes 100 to 2,000 kva. **Send for Bulletin B6325.**

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

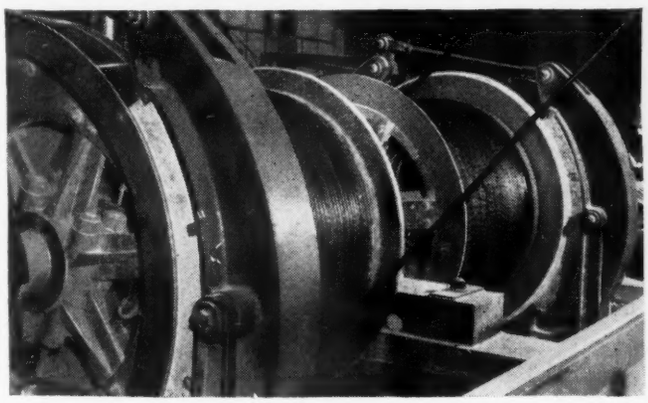
Record!"





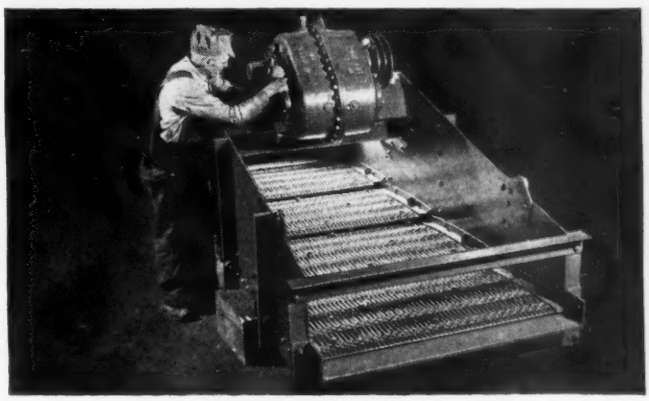
CENTRIFUGAL PUMPS

Both pump and motor were built by Allis-Chalmers! Pump is driven by 1,000 hp, 60 cycle wound rotor induction motor.



MINE HOISTS

MORE ECONOMICAL HOISTING can be obtained with Allis-Chalmers all-electric mine hoists for shaft, skip or slope installations. Allis-Chalmers has built hundreds of hoists, including many of the world's largest . . . has engineered installations that have helped operators greatly reduce hoisting costs. Sure, smooth operation under all load conditions is provided by automatic "Regulex" control. Allis-Chalmers builds *all* auxiliary equipment . . . furnishes *complete* hoist installations for *any* requirement.



BASIC PROCESSING

ESPECIALLY RECOMMENDED FOR DEWATERING small size coal is the compact Low-Head Vibrating Screen equipped with End-Tensioned Deck. Screens are tensioned longitudinally. Coal is distributed evenly over all of the screening area, resulting in better dewatering efficiency. All welded parts are "stress-relieved" for lasting strength. And the Low-Head saves space and installation costs because it operates horizontally . . . requires less headroom. Sizes 3 by 6 to 6 by 16 ft. **Send for Bulletin B6330.**

1847 1947
A CENTURY OF SERVICE
to Industry
THAT MADE
America Great

. . . builds for COAL

Cut your operating costs these 12 ways

—with COAL-FLO conveyor belts

STOP that steady rise in your cost-per-ton. Here are bed-rock facts that speak for themselves. Facts proved by more than 20 years' experience in America's most progressive coal mines. Facts vouched for by cost-wise operators who have cut their operating expense in these 12 major cost items by installing Goodyear Coal-Flo conveyor belting to carry coal outby from face to tipple. Check them off, item by item, and figure how much you could save.

COAL-FLO ECONOMIES

1. Coal-Flo conveyor haulage eliminates tracks and switches, bonding, heavy grading; operates efficiently over pitches and rolls without jamming or mashing coal.

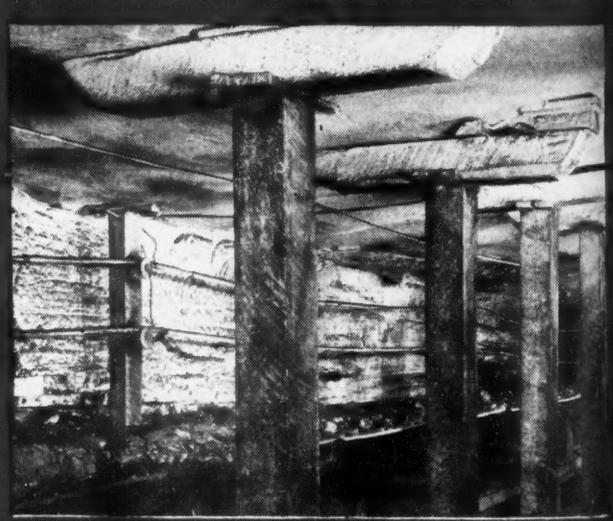
2. Cuts timbering cost 50%. The belt runs close to the rib, enabling you to use a single prop under the center of the roof load, insuring far greater safety, with much less lumber.

3. Up to 20% more lumps in low seams, due to a greater clearance between belt and roof, plus gentler handling.

4. No danger of runaways with peril to "hot-footers." Haulage injuries are virtually unknown.

Let us show you proof — in color

With the willing help of several mines conveyorized with Goodyear Coal-Flo belting, we have just completed an historic color-sound picture that covers the evolution of the coal industry from creel to conveyor. In this motion picture you will see complete, visual proof of every saving mentioned in this advertisement. To see it at your own office, just call your nearest Goodyear Industrial Rubber Products Distributor — his name is in your classified telephone directory.



Timbering costs average about 50% less with Coal-Flo conveyors. The single prop under the roof-center gives greater support and security than two side timbers.

5. Far greater ton-per-hour capacity because haulage is continuous—there's no time lost for car spotting. Your cutters and loaders have no time out.

6. Greater fire and explosion safety through elimination of bare wires and charged coils, sparks and broken cables.

7. Far less brushing—you leave your gob inside even in low-seam coal because Coal-Flo belts require minimum head-room.

8. 50% to 75% lower power, maintenance and operating cost—you have no haulage crews with Coal-Flo belts.

9. Silent operation—you can hear a "working" roof.

10. Fewer roof-falls because of safer timbering and no operating vibration.

11. More uniform power demand—no surges, no peaks and valleys as occur with intermittent haulage. Better voltage regulation.

12. Continuous, uniform, automatic delivery at the tipple—no dumping crew required.

THIS IS VERY IMPORTANT:

To secure ALL these advantages over a long-time period it is essential that you specify Goodyear Coal-Flo belting. It is the only belting that is safeguarded against ALL forms of underground mildew—the greatest enemy of mine belting. That is proved by its records, running as high as 40 million tons in coal service.

Let the G.T.M.—Goodyear Technical Man—give you the factual dollars-and-cents story of many mines that have modernized with Coal-Flo conveyors. Write: Goodyear, Akron 16, Ohio or Los Angeles 54, California.

GOODYEAR

THE GREATEST NAME IN RUBBER

Coal-Flo—T.M. The Goodyear Tire & Rubber Company



Goodyear Coal-Flo belts carry coal outby continuously. There's no stand-by time for spotting—no lost time for loaders.



Slope belt carries coal in continuous flow from underground belts or surge bin to tipple.

Reduce

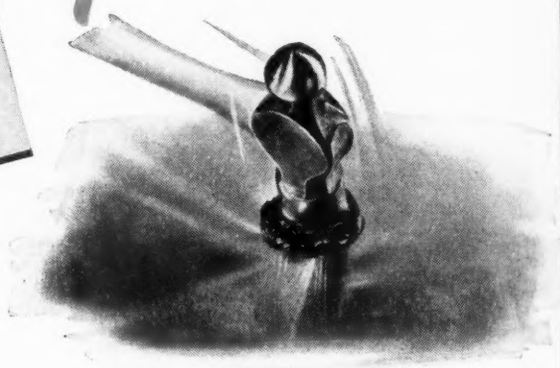
EQUIPMENT MAINTENANCE COSTS

INCREASE BEARING LIFE ...ASSURE FEWER REPAIRS AND REPLACEMENTS!

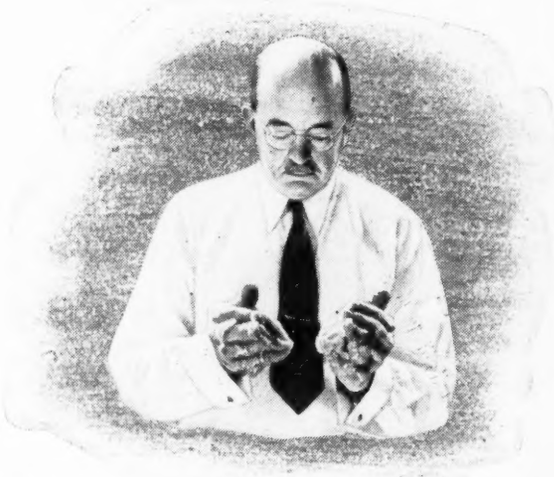
Mine operators everywhere get these cost-cutting benefits by lubricating heavy-duty bearings — plain or anti-friction — with Texaco Marfak.

HERE'S WHY....

1 **MARFAK PROTECTS LONGER.** Hit it as hard as you can, Marfak cushions the blow — doesn't splatter. Just so, Marfak stays in bearings — won't jar out, won't squeeze out.







3 **MARFAK STRETCHES LIFE** of parts. It's cohesive, holds together even when stretched. In a bearing this unique property enables Marfak to seal out dirt and moisture while providing full lubrication. Parts last much longer.

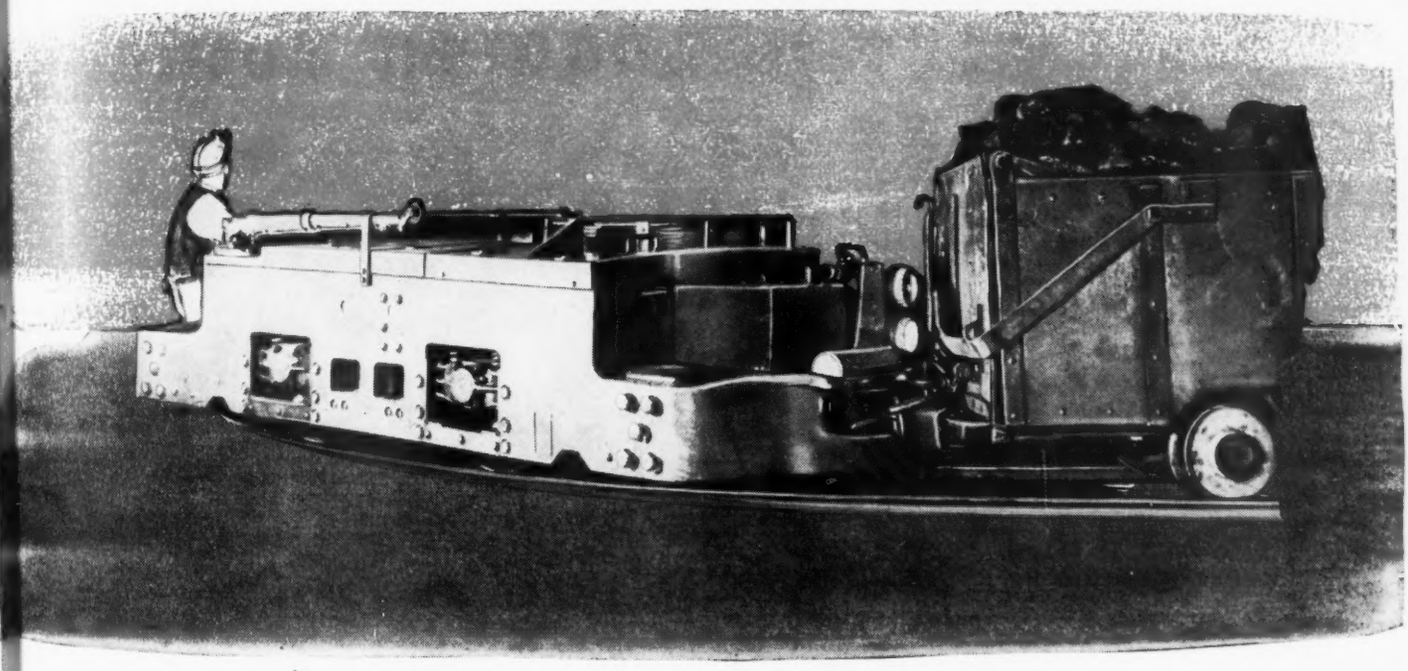
4 **ORDINARY GREASE LACKS** cohesion, has no stretch. It works out of bearings, drops off — thus fails to protect, lets in dirt and moisture. Result: extra expense for frequent greasings, repairs and parts replacements.

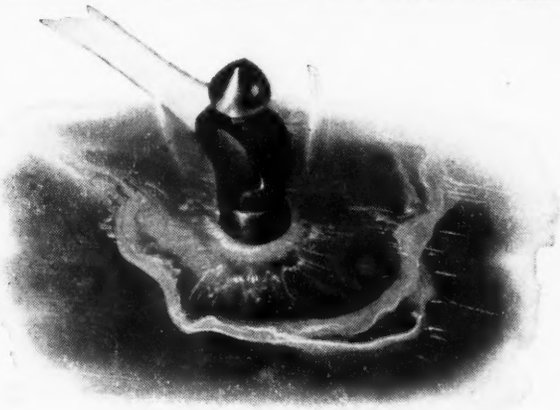
Tune in . . .
TEXACO STAR THEATRE
presents the NEW
TONY MARTIN SHOW
every Sunday night.
See newspaper for
time and station.

TEXACO

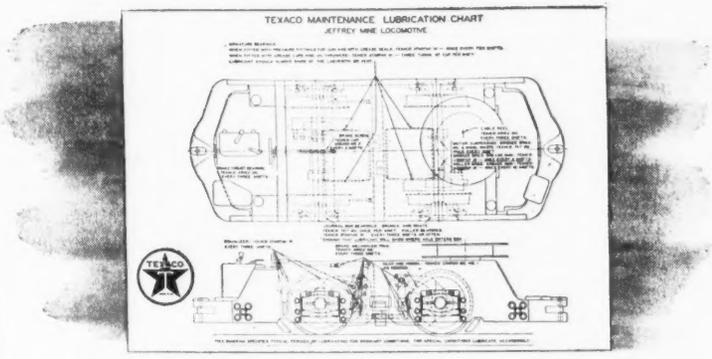
REG. T.M.

TEXACO





2 **ORDINARY GREASE FAILS** to protect. Splatters under even a light blow — a sure sign bearings would soon be left without full protection.



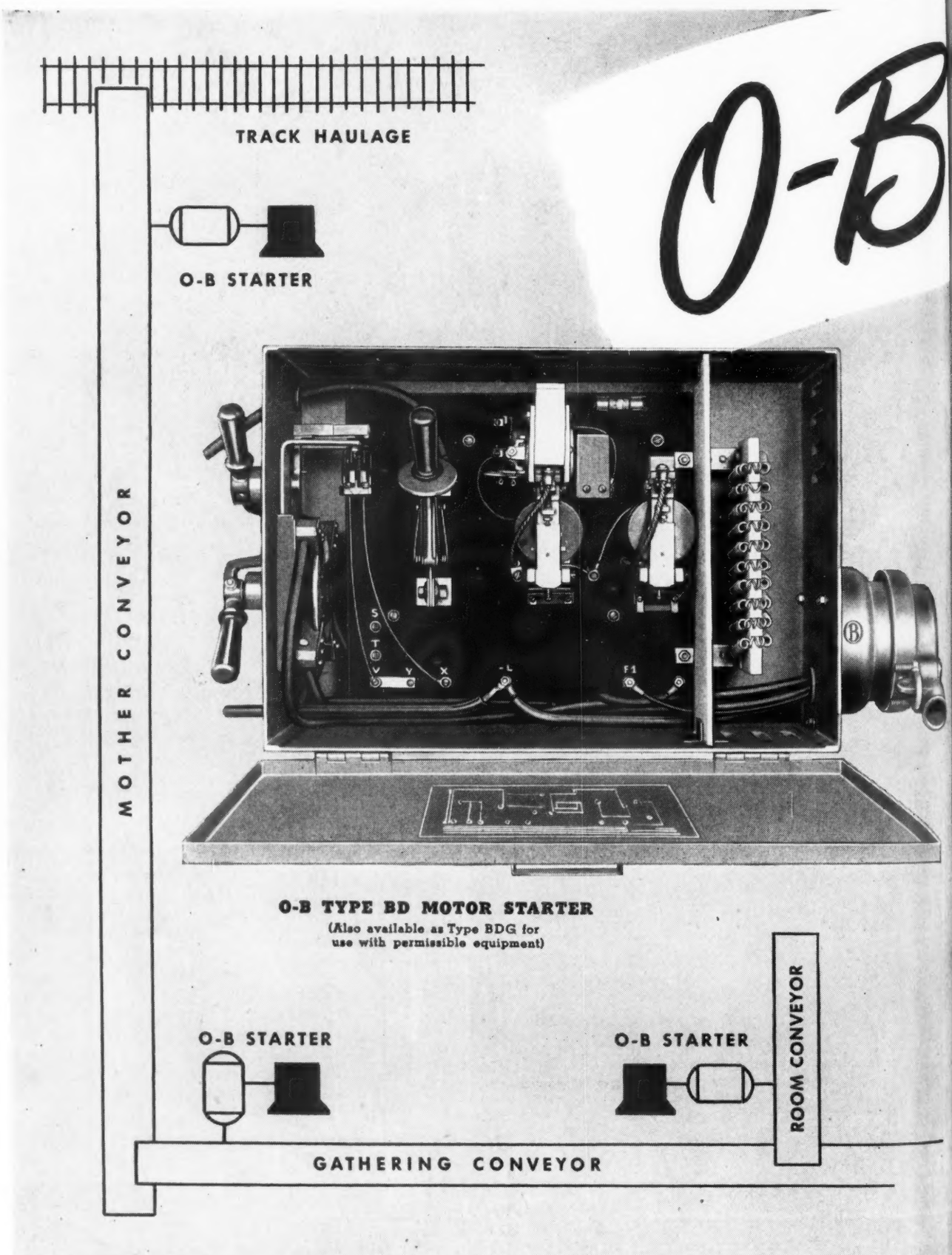
5 **TEXACO MAINTENANCE LUBRICATION CHARTS:** Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

More than 250 Million pounds of MARFAK have been used to date!

Call on Texaco Lubrication Engineering Service for helpful suggestions on cutting maintenance costs. Contact the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C.*, 135 East 42nd Street, New York 17, N. Y.

Lubricants
FOR THE COAL MINING INDUSTRY

From Face to Loading Point . .



FOR A COMPLETE POWER HANDLING SYSTEM . . . FROM SUBSTATION

Motor Starters

Safeguard Conveyor Systems from Electrical Breakdown

From the moment you throw the control switch to "on", an O-B Motor Starter takes over as your watchman, protecting conveyor systems from electrical breakdown.

Whether you use conveyors singly or as an interlocked multiple unit, you can depend upon O-B Starters to keep that system operating efficiently... and at lowest cost.

To understand how O-B Starters give you more for your conveyor dollar, investigate these five reasons why:

1 A sturdy, fool-proof timing arrangement starts motors smoothly and evenly regardless of load. Commutator flashover is eliminated.

2 Line contactors are arranged to fall out instantly upon power outage yet they automatically re-engage in regular starting sequence upon power resumption.

3 Adjustable thermal unit automatically trips line contactor upon short circuit or damaging overload.

4 O-B Starters work without supervision. They may be controlled from remote stations. When used on multiple conveyor systems, O-B Starters can be inter-connected to provide Interlocked Sequence Control.

5 Designed by men who know mining, O-B Starters are built for gruelling service. Their simple yet rugged construction details are obvious signs of lasting dependability.

Only with your conveyor system operating at top efficiency can you keep a steady flow of profit-producing tonnage rolling to the tipple. Assure that profit flow by controlling your motors with O-B Mine-Engineered Starters. Free descriptive literature will be sent upon request.

2789-M

Ohio Brass
MANSFIELD, OHIO
Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

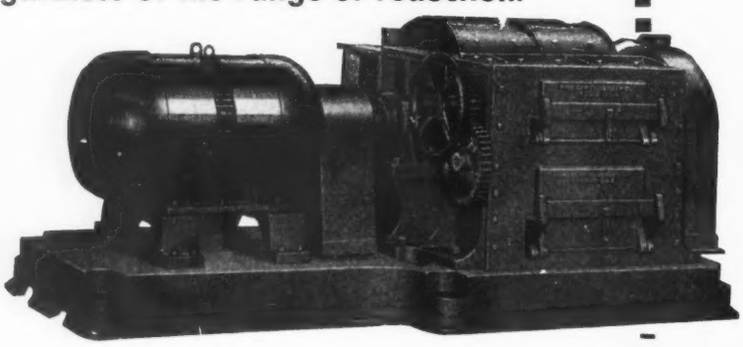
TO FACE . . . SPECIFY O-B

COSTS *go down* TONNAGE *Rises*

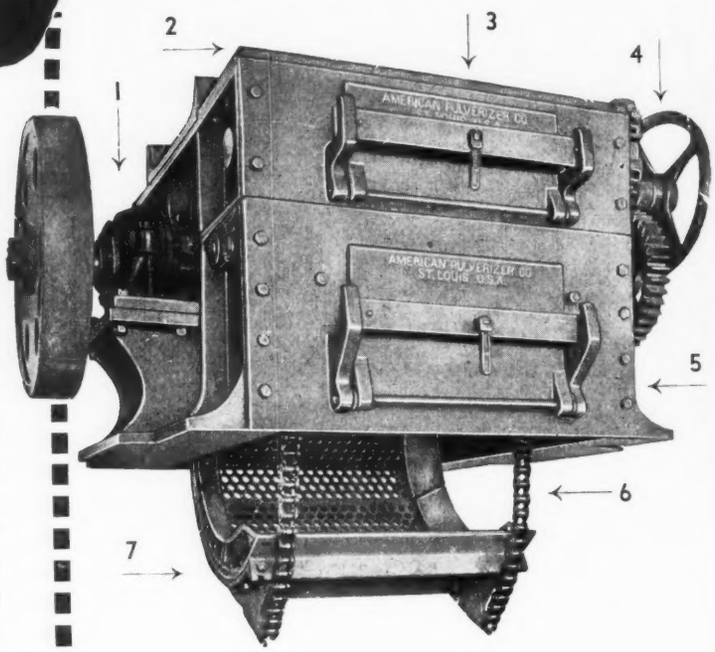
WITH

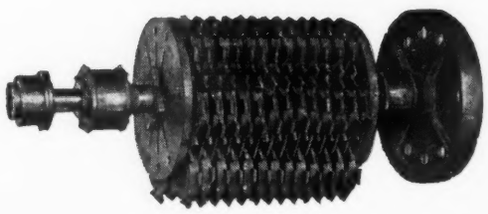
AMERICAN ROLLING RING CRUSHERS

Coal preparation tonnage is greatly improved by the rapid splitting action of the American patented shredder rings. Coal is more uniformly and efficiently reduced by cleavage rather than by blunt shattering impact. The multiple cutting edges in the overlapping rows of shredder rings on the massive rotor results in a high tonnage of uniform screenings at slower RPM rates. This lower speed, **minimizes fines,** results in a low power demand and an over-all operating cost of less than 1c a ton. Whether your crushing is a one-step operation or a circuit, **American Crushers maintain uniform sizing regardless of the range of reduction.**



Numbered arrows indicate a few of American's many points of superiority. (1) Dust-tight, grease-lubricated self-aligning pillow blocks with anti-friction bearings. (2) Massive sectional steel frame with dust-tight machined joints. (3) Door to easily cleaned metal trap. (4) Handwheel to adjust the position or setting of cage. (5) Inspection door to crushing chamber. (6) Chains to raise and lower cage. Raising cage makes product finer, lowering cage makes product coarser—or cage can be dropped completely as shown. (7) Screen cage with sectional manganese steel side liners.





Rotor assembly—note simple construction, compact design and the great number of cutting edges in the many rows of rings—also the overlapping of rings to cover the entire grinding chamber. All rings are mounted on individual shafts and are free to deflect undamaged from tramp metal. The need for shear pins or other conventional safety devices is thereby eliminated.

Send for the "AC" Bulletin on crushing data and crusher specifications.

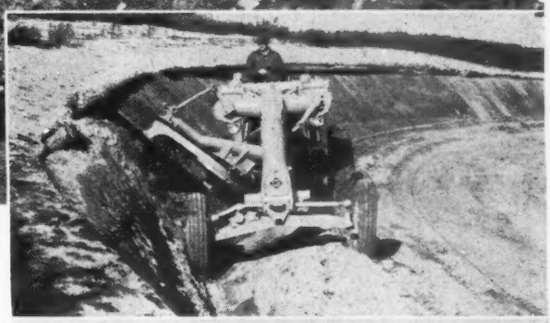
American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE.
ST. LOUIS 10, MO.

MORE WORK-POWER











With owners and operators, it's Performance that Counts! The capacity of a Motor Grader is measured by the work it accomplishes.

Here's why the Allis-Chalmers AD Motor Grader more than meets their requirements:

TRAVEL SPEEDS smoothly synchronized with OPERATOR CONTROLS . . . All the needed power applied as required.

BIG WORKING CLEARANCE. 28″ throat clearance handles bigger windrows without interference.

"ROLL-AWAY" MOLDBOARD. Requires less power to handle bigger loads at faster speeds. Material is *rolled,* not pushed.

21,500 LBS. EFFECTIVE WEIGHT. Balanced for maximum traction and control.

FULL CIRCLE REVOLVING BLADE. Swings *ahead* of platform with plenty of end clearance.

EXCLUSIVE TUBULAR FRAME. Strong, shock-absorbing, protects control rods inside frame.

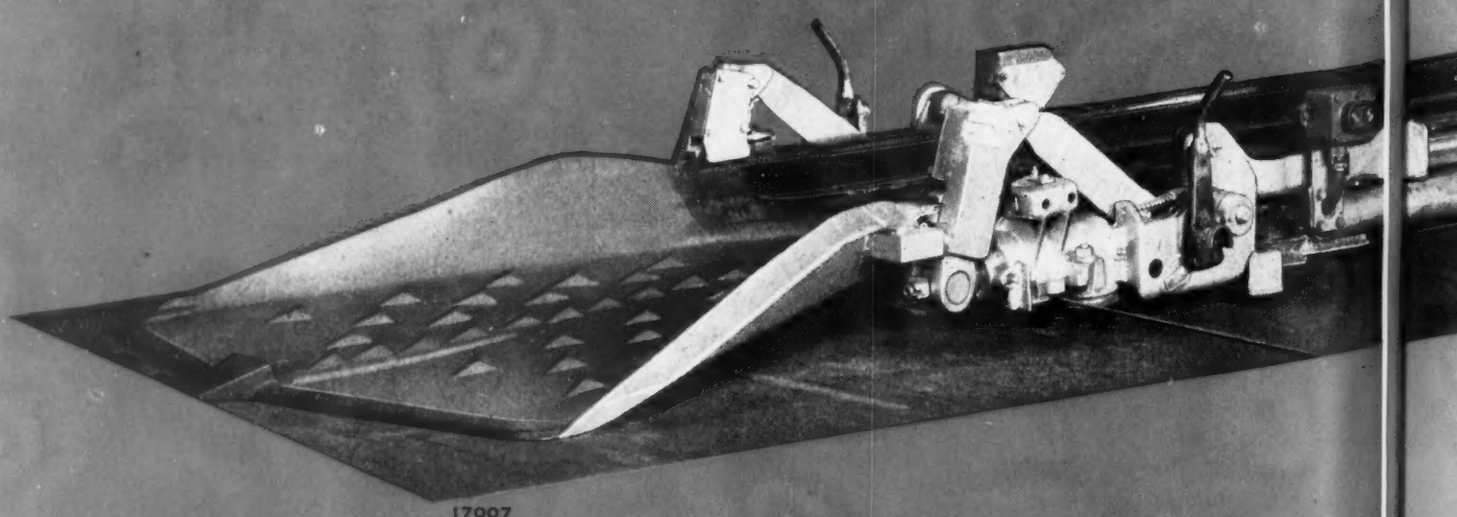
ELECTRIC BRAKES. Control positive, operate with less effort than auto brakes.

FAMOUS 2-CYCLE DIESEL POWER. Dependable, economical, instant-starting.

Users appreciate these features that definitely lessen fatigue — that keep efficiency at a high level — that pay off in more work accomplished.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

THE GOODMAN SHAKER CONVEYOR

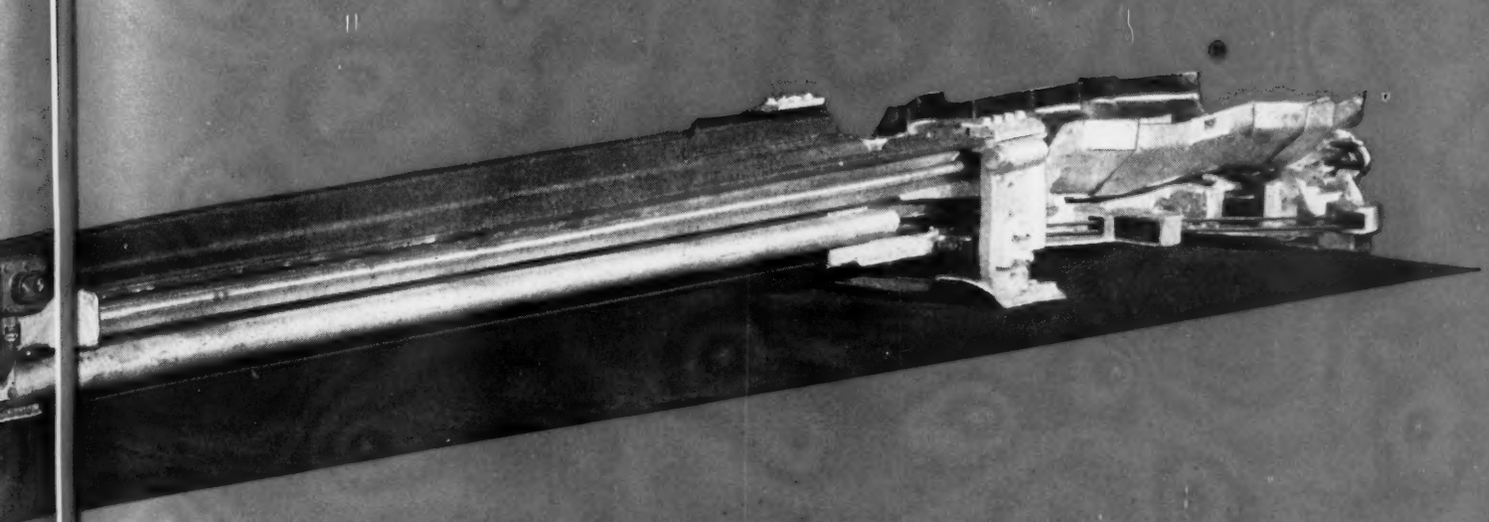


17007

FOR A MORE CONTINUOUS FLOW OF

GOODMAN MANUFACTURING COMPANY

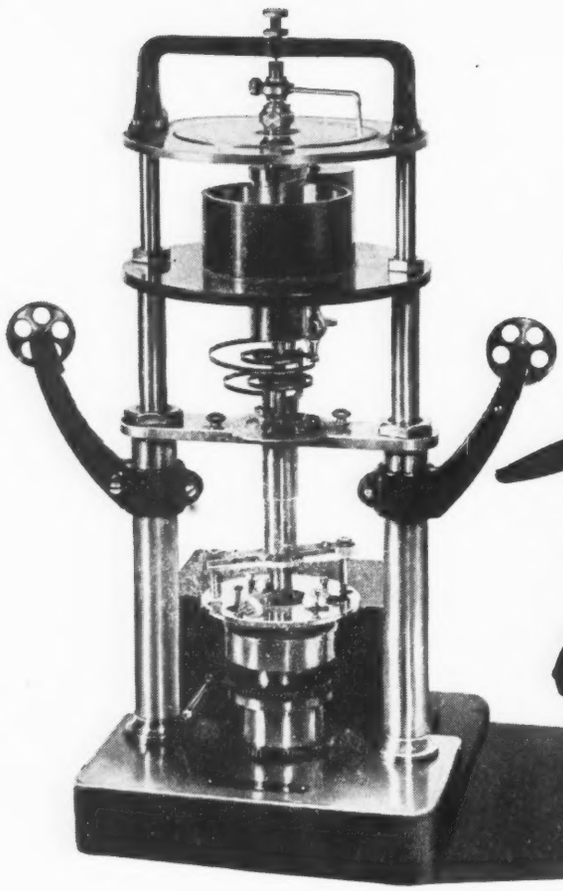
with POWER DUCKBILL . . .



COAL FROM FACE TO ENTRY

The Duckbill loads quickly, retracts fast, swings to a new position easily—giving you a greater effective loading time. All movements are power controlled.

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS



GOVERNOR OF *Friction*

(*Herschel Coefficient of Friction*)

As power is the life blood of industry, friction is the deadly poison that can slow wheels, reduce efficiency to the point of disaster.

Correct lubrication, obviously, is the preventive which protects power against the depredations of friction. And . . . the coefficient of friction of a lubricating oil is an important factor in the utilization of input power in all machines.

Sinclair Research is ever alert to aid you in developing maximum output from your equipment with such apparatus as the Herschel Coefficient of Friction machine, shown above. This machine is invaluable where lubrication of all parts of machinery is concerned.

With such apparatus and the continuous effort of skilled experts in refinery control, Sinclair assures you of outstanding performance from lubricants developed specially for your specific application.

Sinclair Automotive Lubricants for Strip Mining

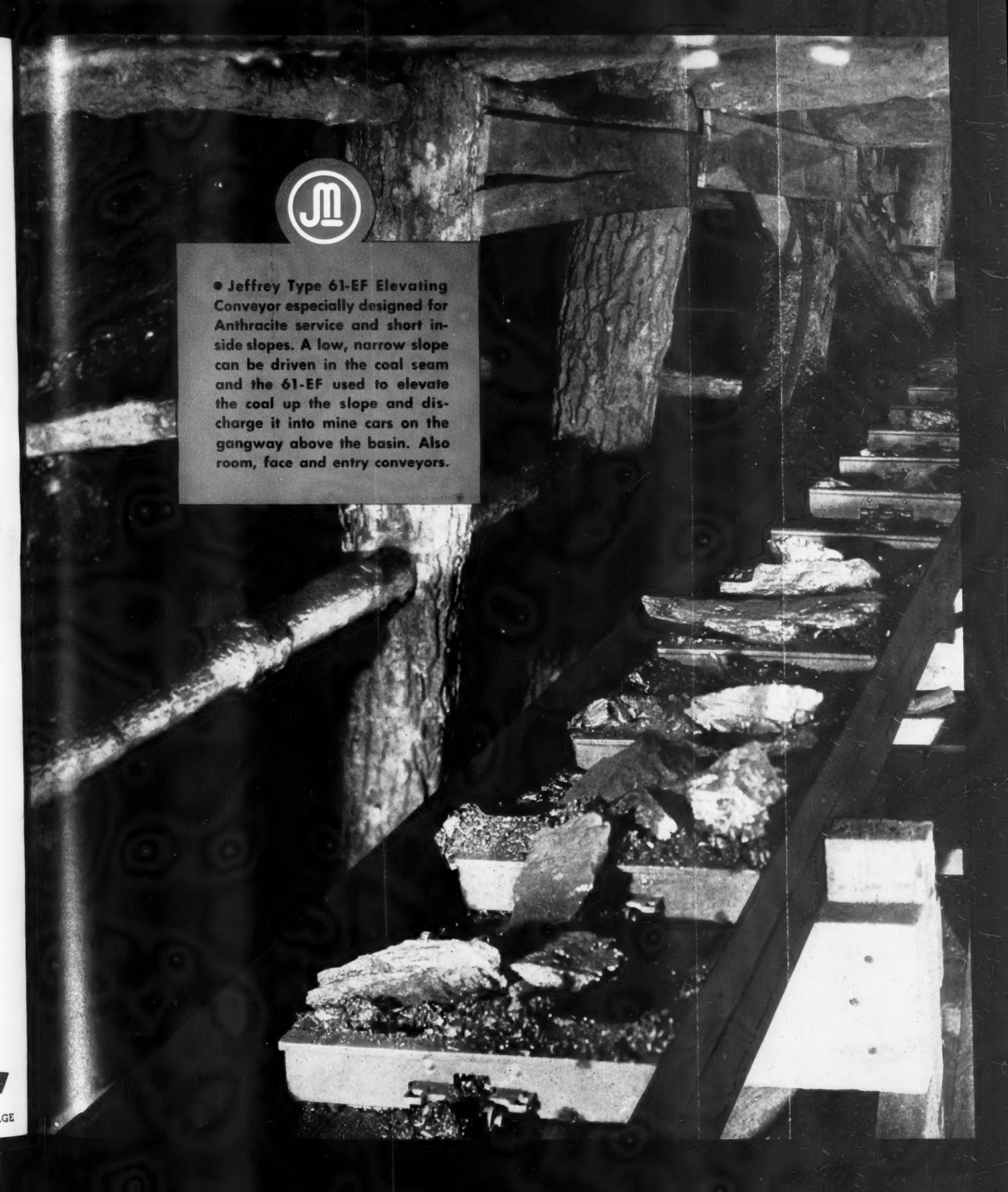
For Engines:
OPALINE MOTOR OIL
OPALINE TBT MOTOR OIL
(For severe service)
TENOL (Heavy Duty — For Diesels)
For Gears:
OPALINE GEAR LUBRICANTS
For Chassis:
OPALINE CHASSIS LUBRICANT
For Wheel Bearings:
SINCOLUBE

SINCLAIR REFINING COMPANY • 630 FIFTH AVENUE, NEW YORK 20, N. Y.

SINCLAIR

Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE


• Jeffrey Type 61-EF Elevating Conveyor especially designed for Anthracite service and short inside slopes. A low, narrow slope can be driven in the coal seam and the 61-EF used to elevate the coal up the slope and discharge it into mine cars on the gangway above the basin. Also room, face and entry conveyors.







5,000,000 FAMILIES USE ANTHRACITE

to heat their homes

Within its eleven-state distribution area, Anthracite is the dominant fuel. Clean, slow burning, easy to control automatically or by hand firing this rich, hard coal is the choice domestic coal in those states where it is available.

The increased demand for domestic use has resulted in the mechanization of many Anthracite producing mines. Today, Jeffrey shortwall cutters—chain conveyors—locomotives—drills and fans are being used extensively to increase production and to reduce costs.

Jeffrey engineers can help you determine the type and kind of equipment best suited to your needs. Consult them on your Anthracite as well as Bituminous mining problems.



JEFFREY EQUIPMENT FOR COAL MINES

Jeffrey service to Coal Mines means service to all industry

★ CUTTERS

BLOWERS

FANS

LOADERS

CONVEYORS

DRILLS AND DRILLING MACHINES

LOCOMOTIVES

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED IN 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

SALES OFFICES:

Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

SERVICE STATIONS:

Pittsburgh, Harlan, Ky., Birmingham, St. Louis, Logan-Beckley W. Va., Scranton

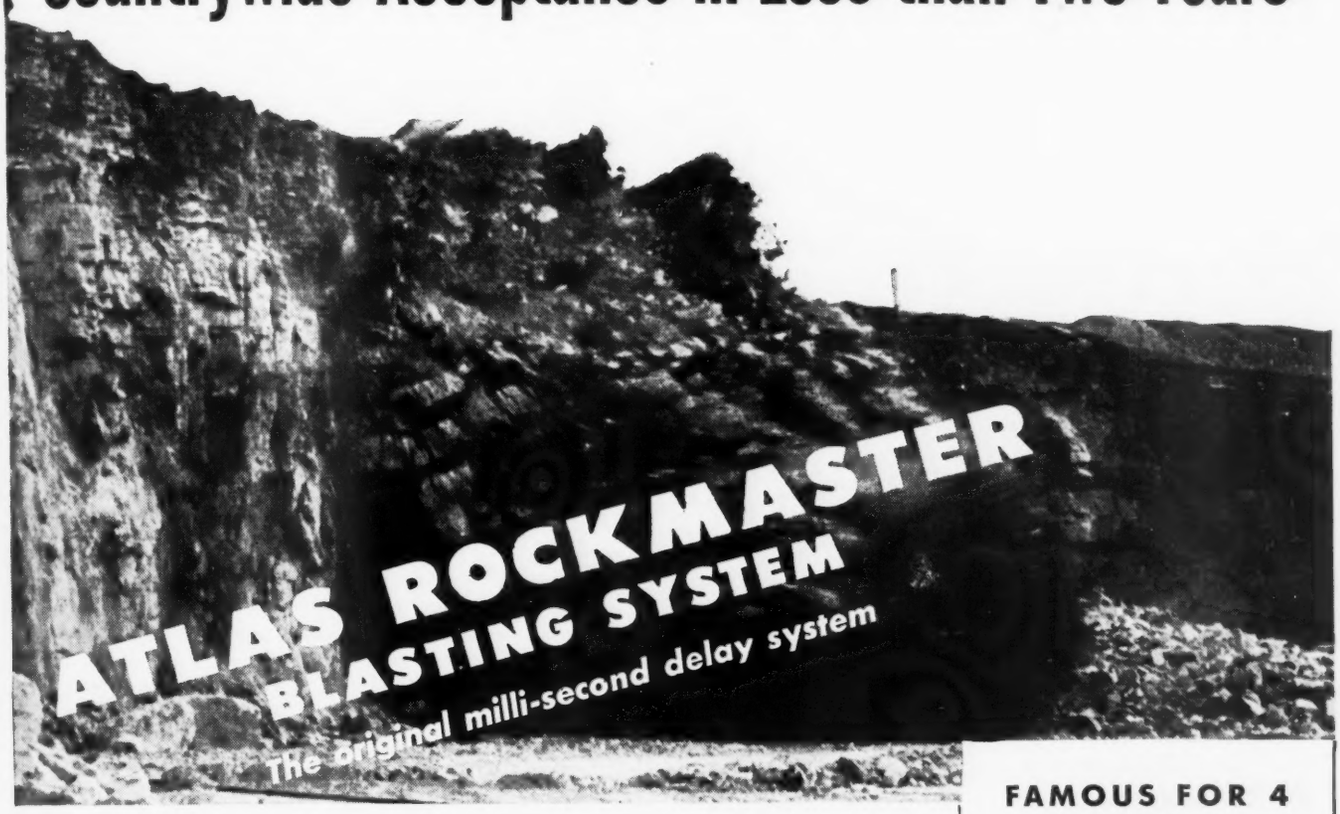
FOREIGN PLANTS:

British Jeffrey-Diamond, Ltd. Wakefield, England

Jeffrey Mfg. Company, Ltd. Montreal, Quebec

Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.

Countrywide Acceptance in Less than Two Years



Want to get better fragmentation of your rock? Increase production as much as 30%? Reduce "back break"? Cut down complaints about noise and vibration, even though you fire more holes? Put Atlas Rockmaster to work!

All over the country blasters are getting results like these with the Atlas Rockmaster Blasting System—in quarries, strip pits, on construction work, even underground in many cases! Wherever this sensational development has proved applicable, *greater efficiency* has always followed—sometimes in one way, frequently in all four.

Pioneered and originated by Atlas, Rockmaster is a whole new system of blasting that controls the delay elements of a shot within thousandths of a second—split-timing such as has never before been possible. The system was introduced in 1945. More than 2,000,000 special Rockmaster electric blasting devices were sold in 1946 alone! And two years of experience with split-second delay blasting have given Atlas blasting technicians a background of know-how that cannot be gained in any other way.

Today there are many imitations of this amazing blasting system, but only one *original* Rockmaster that has proved itself with spectacular results—the kind of results *you* want. Call in the Atlas representative and talk over your problem. He'll be glad to show you how Rockmaster can help.

FAMOUS FOR 4 OUTSTANDING RESULTS

1. **MORE ROCK READY FOR SHOVEL**
2. **BETTER FRAGMENTATION**—Less secondary blasting. Shovel efficiency increased as much as 30%
3. **FAR LESS "BACK BREAK"** behind your shots
4. **MINIMUM NOISE AND VIBRATION,** even though more holes are fired.



Less Bark . . . More Bite

"ROCKMASTER"—Trade Mark

ATLAS EXPLOSIVES
"Everything for Blasting"

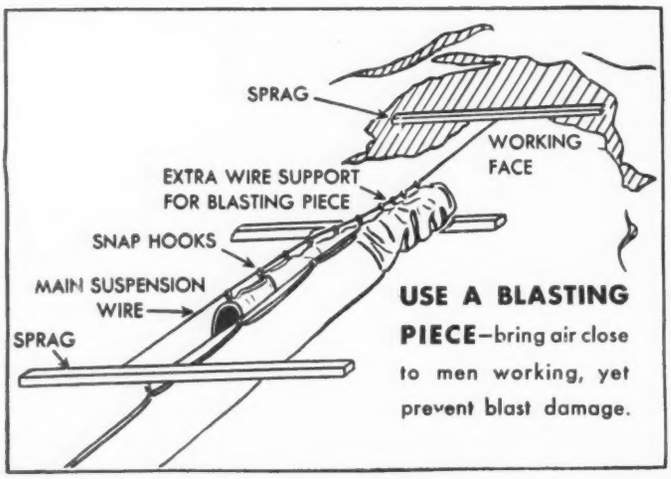
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

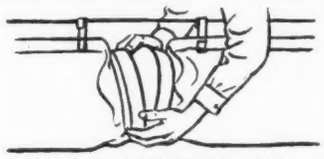
THINGS TO DO WITH "VENTUBE"

to get better ventilation at lowest cost

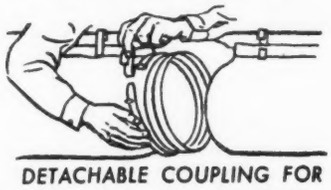




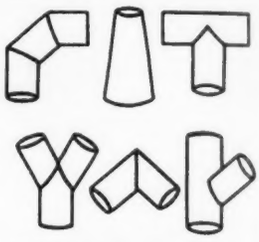
USE A BLASTING PIECE—bring air close to men working, yet prevent blast damage.



BUILT-IN COUPLING FOR SPEEDY INSTALLATION

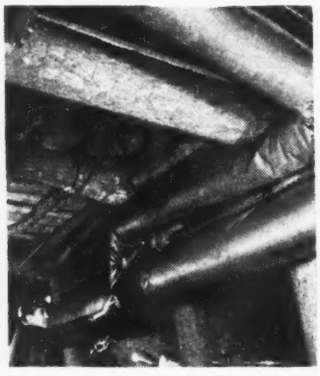


DETACHABLE COUPLING FOR ECONOMY AND SPLICING



USE THE PROPER FITTINGS to get greatest amount of air with least labor and power cost.









CARRIES AIR INTO DEAD ENDS • TWO DUCTS—ONE FAN • FOLLOWS CROOKED OPENINGS • HANGS OUT OF THE WAY

How "Ventube"* cuts costs and speeds your output . . .

1. Helps miners do a good day's work. Good velocity of fresh air for cooling power. A little more air velocity often makes possible a lot more physical effort. Often lowers humidity and temperature at working face.

2. Helps management plan fast, steady production. Clears face quickly after blast for intermittent blasting and uninterrupted cycle of mucking, drilling, blasting. Keeps men alert to pull down accident rate.

3. Keeps up with work. Follows the most tortuous working. Avoids need for many costly special fittings on curves. Takes up less room in openings. Easily directed to heading.

4. Saves man-hours. Costs one-third as much to install as rigid-type ventilation. One man can carry 100 feet of tubing and install complete in one hour. Easy to move. Collapses to fit in small space between jobs.

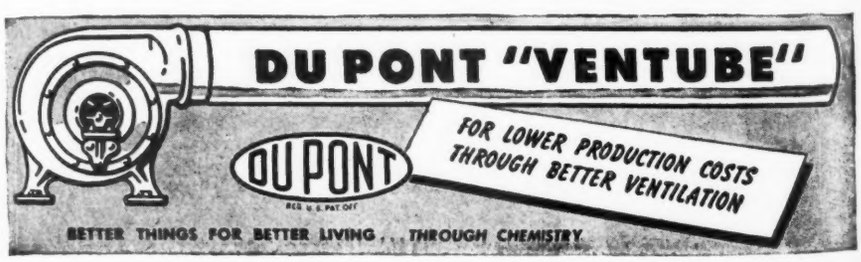
5. Saves power. Costs 1/10 as much as compressed air for each 1,000 cu. ft. of air released at working face. Low initial cost permits larger tubing and lower friction losses. Long lengths permit fewer joints. Patented coupling makes airtight connection quickly.

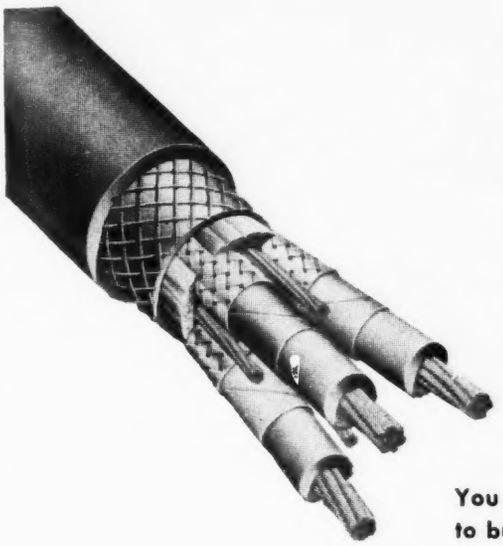
6. Saves damage. Collapsed and retracted easily to avoid damage from blast. Pushed aside or removed easily to bring large equipment up to face. Coated with neoprene synthetic rubber for better resistance to acid mine water and fungous growths. No deformation of tubing ends.

WRITE FOR "VENTUBE" BOOKLET

Tells how to increase mining efficiency with "Ventube" attached to blower fan. E. I. du Pont de Nemours & Co. (Inc.), Fabrics Division, Fairfield, Conn.

*"VENTUBE" is Du Pont's registered trade mark for its flexible, synthetic-rubberized ventilating duct.

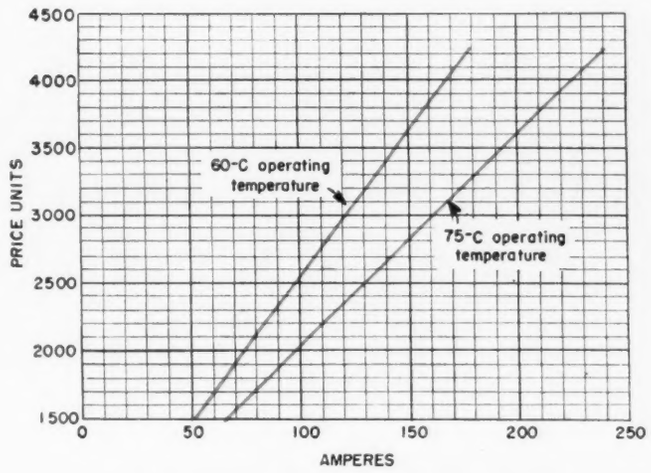




NOW YOU CAN SAVE UP TO 20% AND MORE ON PORTABLE CABLE PURCHASES

You get greater value per dollar with Geoprene Portable cable. It costs less to buy, and what's more, it lasts longer. Here are the facts:

GEOPRENE PORTABLE costs less to buy



High-temperature insulation raises current-carrying capacity, permits use of lower-cost, smaller-size cable.

As shown on the graph, which is based on 5000-volt SH-D cables, average savings in first cost are about 19 per cent, based on the smaller cable size which can now be employed on any given job. Current-carrying capacity has been increased appreciably by use of insulation approved for 75-C operation, instead of the 60-C insulation normally used, with no increase in cost.

On larger cables this saving is particularly important, not only in first cost, but in greater handling ease due to the decreased weight and bulk. For example, a shovel previously requiring a 4/0-awg conductor size can now be served by a 2/0-awg cable.

GEOPRENE PORTABLE costs less to maintain

Most critical factor in portable-cable life is the abuse-resistance of its jacket. And Geoprene* hits a new high in strength and chemical stability. In standard tests *its tear strength is two and one-half times as high as Tellurium,* our famous prewar natural rubber jacket. This remarkable resistance to cutting action and abrasion boosts the life and safety of Geoprene Portable well beyond that of an ordinary portable cable. In addition, Geoprene exhibits 105 per cent better aging properties than required by industry specs., and carries Pennsylvania Dept. of Mines Approval P-108 for flame resistance.

When the facts are combined, Geoprene Portable with its 75-C operating temperature offers a double value compared to cables with rubber jackets and 60-C insulations. And it's less bulky, lighter weight, and easier to handle.

May we suggest that you remember this longer life at a lower price the next time you need portable cable. For details, call your G-E representative or write for bulletin GEA-4229. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

*Geoprene—special G-E compound containing approximately 60 per cent neoprene, with the balance consisting of plasticizers, accelerators, and reinforcing agents.

GENERAL ELECTRIC

502-70

This Emblem

INTERNATIONAL

Identifies Great Trucks



BACK OF THE TRUCK—THESE 3

International TRUCK SERVICE • International ENGINEERED PARTS • International APPROVED ACCESSORIES

Rugged stamina! Long mileage! Economy of operation!

International Trucks provide all three in such abundance that for 16 years more heavy-duty International Trucks have served American commerce and industry than any other make.

And to make sure that every operator gets every profitable mile and every available economy from every International Truck, this is the *Three-Part Service* International provides:

MAINTENANCE AND SERVICE

Quickly available everywhere from thousands of International Dealers and the nation's largest company-owned truck-service organization—International Branches.

ENGINEERED PARTS

Precision-made, like the originals in International Trucks—wear better and last longer.

APPROVED TRUCK ACCESSORIES

A complete line for every truck need. Triple-checked against the most rigid standards to assure efficient, trouble-free performance.

Yes, International *Three-Part Service* makes sure that operators get the extra mileage, the dependable stamina and the low operating cost built into all International Trucks.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 N. Michigan Ave., Chicago 1, Illinois

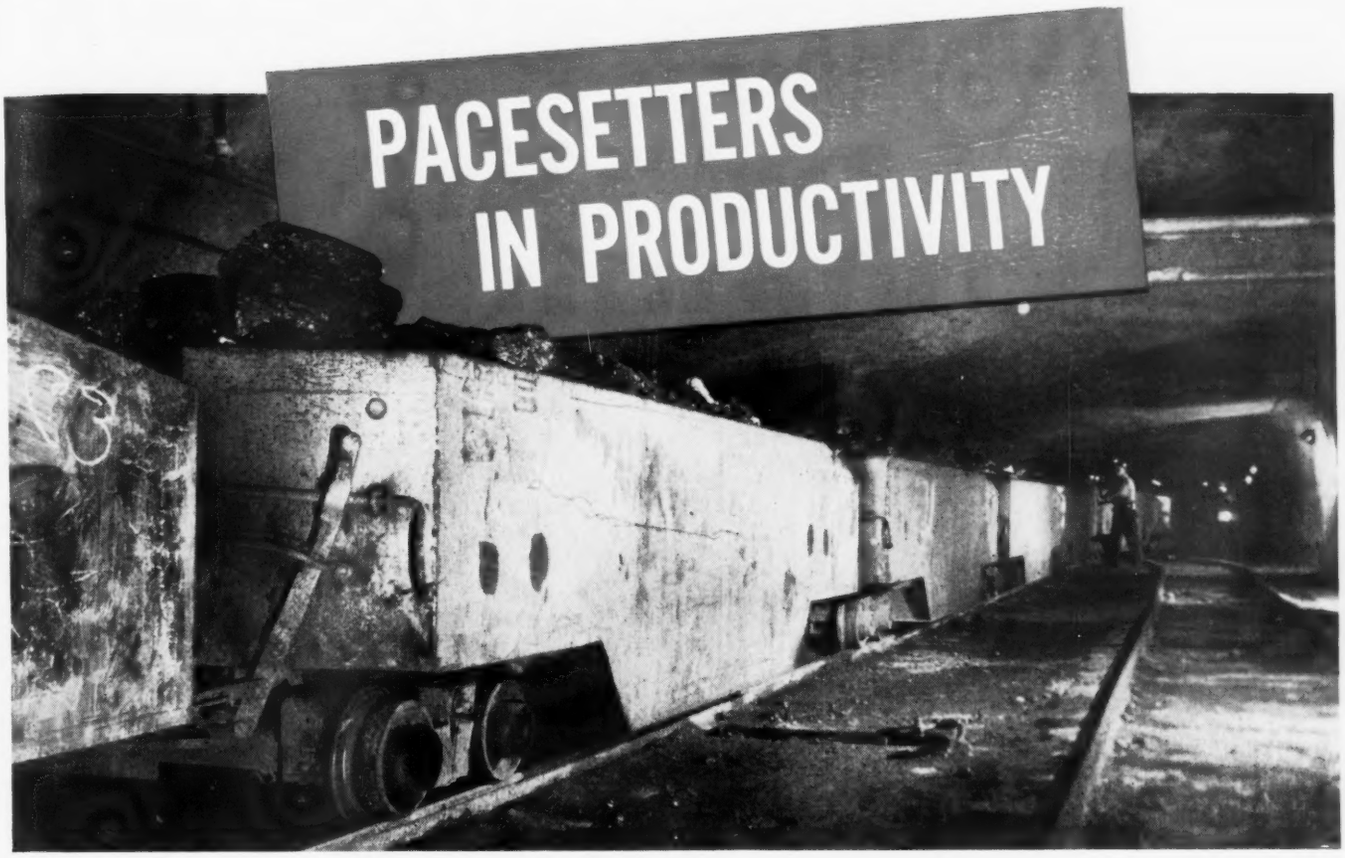
40TH ANNIVERSARY OF INTERNATIONAL TRUCKS

1907-1947—Forty years of International Truck Service to Industry, Commerce, Agriculture

INTERNATIONAL

Tune in James Melton on "Harvest of Stars" Sunday! NBC Network

INTERNATIONAL *Trucks*



LARGE CAPACITY MINE CARS

—built of U·S·S COR-TEN!

BIGGER mine cars boost mine output and increase operating efficiency in three ways—(1) they speed up transportation, (2) can utilize more fully the productive capacity of mechanical loaders, and (3), when built of U·S·S COR-TEN, they reduce operating and maintenance costs.

16,100 mine cars—built larger, stronger or lighter with U·S·S COR-TEN are today in service. More than a thousand of these COR-TEN cars have been in use for more than ten years . . . we have yet to hear of a single failure due to wear!

There is a reason for this. It's because U·S·S COR-TEN—with a yield point 50% greater than plain structural steel, with greater resistance to abrasion, shock and fatigue—is protected against deterioration by COR-TEN's *unusually high resistance to atmospheric corrosion* (4 to 6 times that of plain steel).

Thus, when *longest possible car life* is desired and U·S·S COR-TEN is substituted for plain carbon steel, thickness for thickness, not only the strength of the car but its durability are substantially increased.

On the other hand, when weight saving is of prime consideration and U·S·S COR-TEN is used in reduced thicknesses, car strength still superior to that of heavier plain steel construction can be attained. At the same time, the high resistance to atmospheric corrosion inherent in COR-TEN so materially retards corrosive action that car life can be as long, or even longer, than when heavier plain steel construction is used.

These are facts that we will gladly prove to you from our records of installations in which mine conditions closely approximate your own.

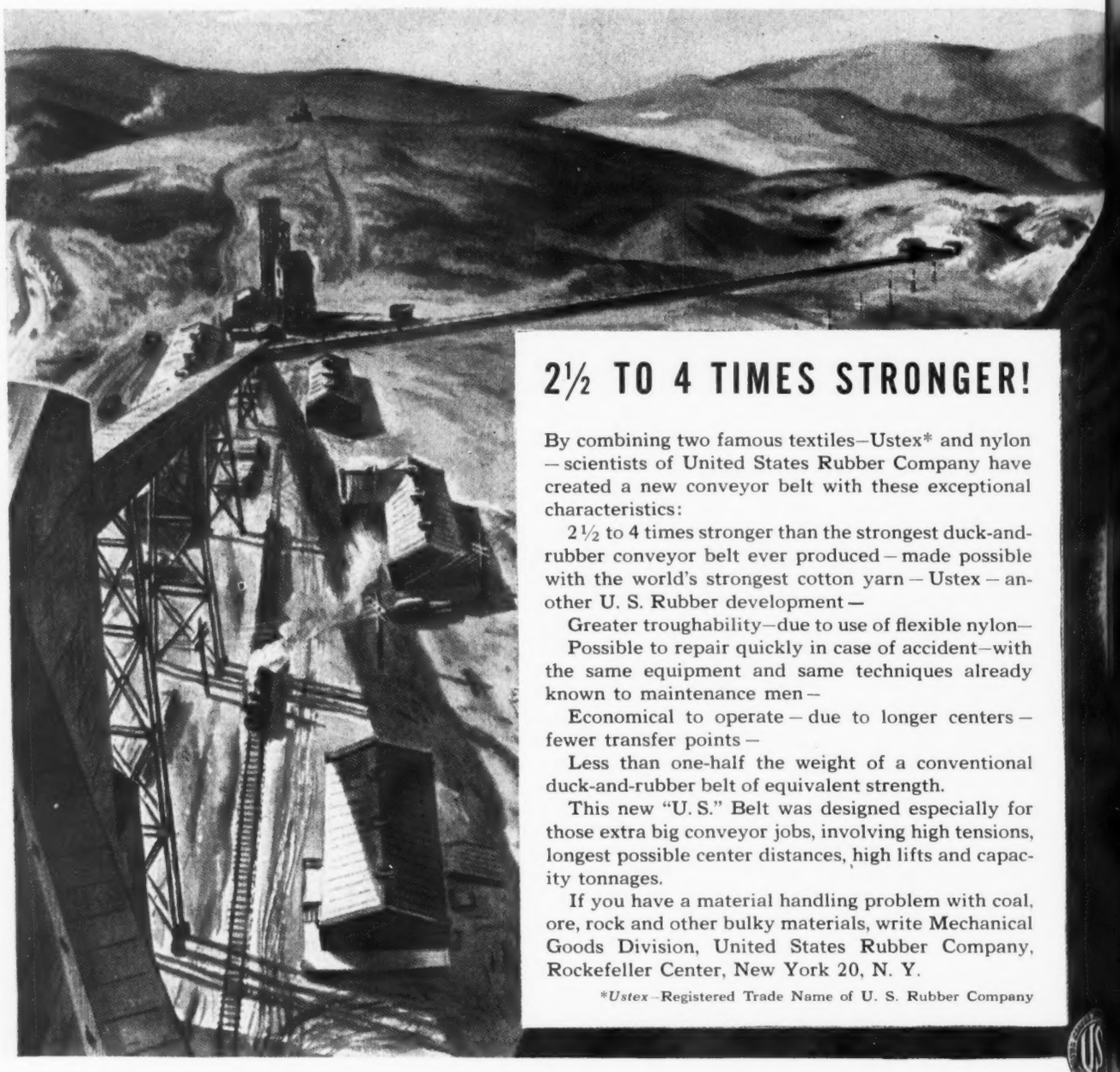
USS HIGH STRENGTH STEEL — UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York
7 372

UNITED STATES STEEL

UNITED STATES RUBBER COMPANY

AN AMAZING NEW



2½ TO 4 TIMES STRONGER!

By combining two famous textiles—Ustex* and nylon—scientists of United States Rubber Company have created a new conveyor belt with these exceptional characteristics:

2½ to 4 times stronger than the strongest duck-and-rubber conveyor belt ever produced—made possible with the world's strongest cotton yarn—Ustex—another U. S. Rubber development—

Greater troughability—due to use of flexible nylon—

Possible to repair quickly in case of accident—with the same equipment and same techniques already known to maintenance men—

Economical to operate—due to longer centers—fewer transfer points—

Less than one-half the weight of a conventional duck-and-rubber belt of equivalent strength.

This new "U. S." Belt was designed especially for those extra big conveyor jobs, involving high tensions, longest possible center distances, high lifts and capacity tonnages.

If you have a material handling problem with coal, ore, rock and other bulky materials, write Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

*Ustex—Registered Trade Name of U. S. Rubber Company

FOR SUPER-TENSION

CONVEYOR JOBS...COAL • ORE • ROCK • GRAVEL

...Serving Through Science...ANNOUNCES

CONVEYOR BELT



NEW SUPERLA

MINE LUBRICANT NO. 0

Cuts oil consumption here as much as 75%

STAYS on the job far longer than regular motor oil in oil lubricated gear cases! Tests proved this about new Superla Mine Lubricant No. 0. In fact, in these tests—made on properly maintained loaders under actual mine operating conditions—the new lubricant lasted up to *four times* as long as the regular motor oil!

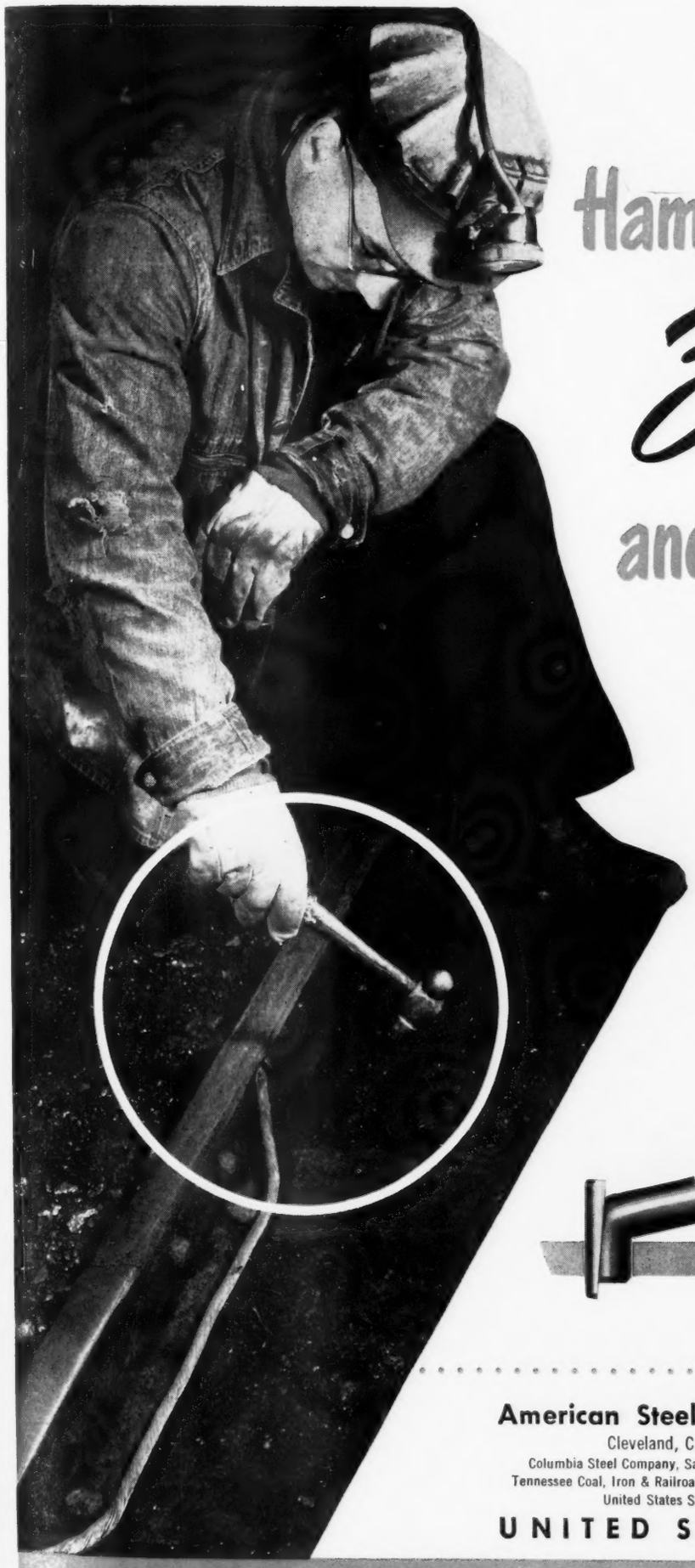
At the same time, it gave clean operation. After four months' service with Superla No. 0, there were no carbon deposits in the gear cases, on clutch plates, in bearings, or on the sides of the gears.

Cleaner operation brings smoother clutch action and thus helps operators load faster. It saves time and labor through minimizing the need for cleaning gear cases and replacing worn parts. And remember, Superla No. 0 brings you these advantages on top of saving up to 75% in oil consumption.

A Standard Oil Lubrication Engineer will explain the properties of Superla Mine Lubricant No. 0 that make it especially effective for loader lubrication. Write Standard Oil Company (Ind.), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.



STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

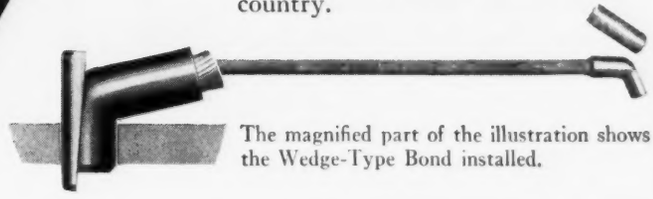


Hammer the Wedge... 3 times and the bond is in

You will go for the U·S·S American Wedge-type bond in a big way—once you use it. Just hammer each wedge three times and the bond is in to stay. No welding—no lugging of heavy equipment—a drill and a hammer are all the tools you need.

In spite of its simple application, the wedge-type bond holds with a grip that won't shake loose. But if you want to remove the bond from temporary trackage, you can hammer it out as easily as you put it in.

Like all U·S·S American Bonds, the quality is of the highest order. The terminal is copper and the wedge is drop-forged steel. The bond is widely used in mines throughout the country.



The magnified part of the illustration shows the Wedge-Type Bond installed.

American Steel & Wire Company
Cleveland, Chicago and New York
Columbia Steel Company, San Francisco, Pacific Coast Distributors
Tennessee Coal, Iron & Railroad Co., Birmingham, Southern Distributors
United States Steel Export Co., New York

UNITED STATES STEEL

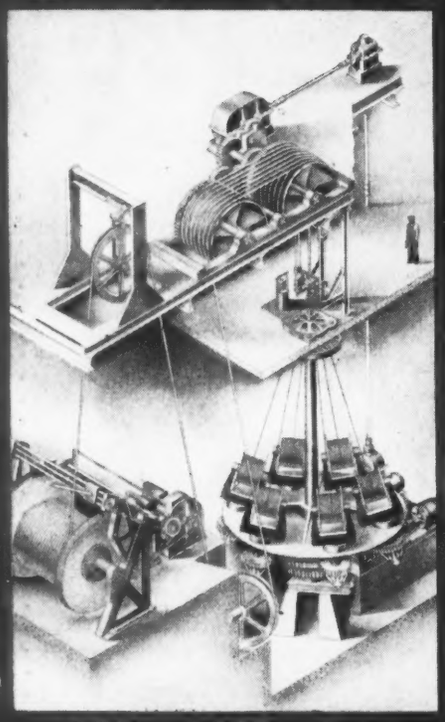
AMERICAN STEEL & WIRE COMPANY · USS · AMERICAN RAIL BONDS · UNITED STATES STEEL

U·S·S American Wedge-Type Rail Bonds

Here's union's *Wire Rope* Formul

MM+OE+

MODERN MACHINERY PLUS OPERATING EXPERIENCE





M. B. HANSELL, SR.
SUPERINTENDENT OF MAINTENANCE

For 41 years a master of machinery. For 20 years in charge of installation and maintenance of all Union Wire Rope machinery; including the giant 4 story closing machine at the left. It is capable of producing 27 tons of wire rope in one continuous length or up to 4" diameter.



A. D. GALLOWAY
SUPERINTENDENT ROPE MILL

For 28 years a specialist in the stranding of wires of the right size and correct steel and closing of the right strands into hundreds of different wire rope constructions. A "know how" specialist who has trained hundreds of craftsmen.



CURTIS VOIGTLANDER
SUPERINTENDENT WIRE MILL

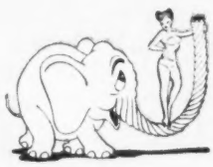
For 43 years actively engaged in the drawing of high carbon wire and the training of craftsmen in all the intricate processes. Under his supervision many new and advanced wire making machines have been built, many others improved.

union-formed is *Preformed*



UNION-FORMED SPOOLS BETTER

. . . even with a light load it winds evenly and tightly.



UNION-FORMED RESISTS KINKING

. . . because wires and strands are free of internal stress, they do not fight to get out of their preformed positions.



UNION-FORMED RESISTS BENDING FATIGUE

. . . withstands more bends, even reverse bends, because it is more stress-free internally.

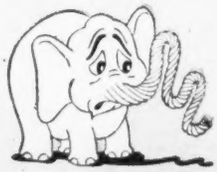
UNION-FORMED RIDES BETTER ON GROOVES

. . . does not spin and grind through blocks or over sheaves.



UNION-FORMED IS SAFER TO HANDLE

. . . worn, broken wires do not spring out and porcupine but continue to lie close to the rope.



UNION-FORMED IS FLEXIBLE AND RELAXED

. . . bends in any direction, yet has "toughness" to withstand jerking and other punishing strain.



TKH=CQ

PLUS TECHNICAL KNOW HOW EQUALS CONSISTENT QUALITY



C. M. ZERR
CHIEF ENGINEER

Since graduating at Stevens Institute of Technology, he has specialized in all technical and research phases of wire rope making as assistant to Walter Voigtlander. Their technical department is the training ground for operation men, salesmen and technicians.



WALTER VOIGTLANDER
TECHNICAL DIRECTOR

For 43 years engaged in wire rope technology and research. Under his direction for 20 years, the Union Wire Rope laboratory and technical staff has become widely recognized as the foremost in the industry. From this continuous research comes new rope constructions, new rope making equipment and consistent quality.

Wire rope in itself is a machine. It functions as the steel tendons of many types of machines and to be good it must be made on the most modern of machines. Many of the machines in the Union Wire Rope plant have been either wholly designed or improved by our own mechanical engineers.

These precision machines must be minutely adjusted and maintained in perfect condition to produce uniformly high quality in all of the hundreds of different wire rope constructions. Many years of operating experience is contained in the Union wire rope making formula.

The most vital ingredient is Technical Know How. It is obtainable only from long years of training, experience and continuous research. Ours is an organization of specialists who devote their whole time to wire rope making. It is headed by top flight engineers and technicians who through research are constantly acquiring more know how for use in specifying the finest wire rope making steel; in making every wire rope drawing process improve each heat of steel still further; in constructing wires of the finest steel into stronger, tougher wire ropes, both ordinary and Union-formed (*pre-formed*); in the development of new wire rope constructions to whip jobs noted as rope killers.

NEAR YOU THERE IS A UNION WIRE ROPE DISTRIBUTOR AND REPRESENTATIVE CAPABLE OF APPLYING UNION "KNOW HOW" IN THE FIELD

Large and regular doses of "know how" are given Union Wire Rope's field specialists and distributing organizations. They know that Union Wire Rope must do a consistently better job on the job for which it is constructed. Each field specialist, each distributor is fully equipped with a thorough working knowledge of wire rope applications and is capable of making sound recommendations. Each is a substantial citizen contributing to the economic and social welfare of his community and is an important factor in maintaining the American way of opportunity and freedom unequalled anywhere in the world.

Backed by "know how" specialists, each Union Wire Rope distributor is out to earn and hold your good will.

union Wire Rope Corporation

2130 MANCHESTER AVE., KANSAS CITY 3, MO.

Send "Steel Tendons," the book that gives a pictorial trip through your modern plant.

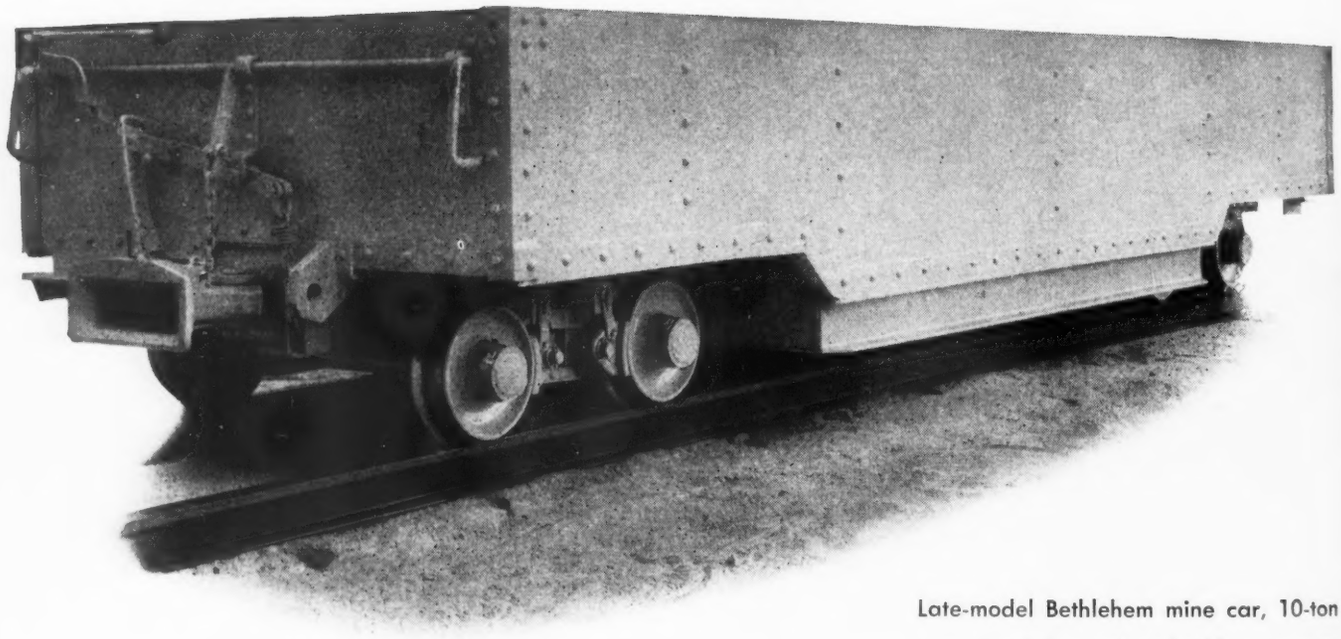
FIRM NAME.....

BY.....

ADDRESS.....

CITY.....STATE.....

Cost per year... LOW because it's all-steel



Late-model Bethlehem mine car, 10-ton capacity. It is equipped with automatic self-centering couplers, roller-bearing trucks, and brakes that are self-equalizing on either curved or tangent track. This is a rotary-dump type of car.

A Bethlehem all-steel mine car lasts so long that its cost per year is reduced to a very low figure.

Long life means small yearly amortization. This is the rule with Bethlehem's all-steel mine cars, because steel construction stands up best against the bruising and battering that are routine in coal mining.

Another point: because these cars are able to take a pounding, they spend little time on the sidelines asking for repairs. Hence your shop maintenance facilities need not be extensive.

Whether you want end-dump or rotary-dump, high- or low-side types, Bethlehem can build them for you at its modern, well-equipped car shops. We're old hands at this business of making good mine cars—smooth-running, durable four- and eight-wheelers.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

This formula

can help you
reduce down time and
maintenance costs
in your mine . .

GULF QUALITY OILS AND GREASES

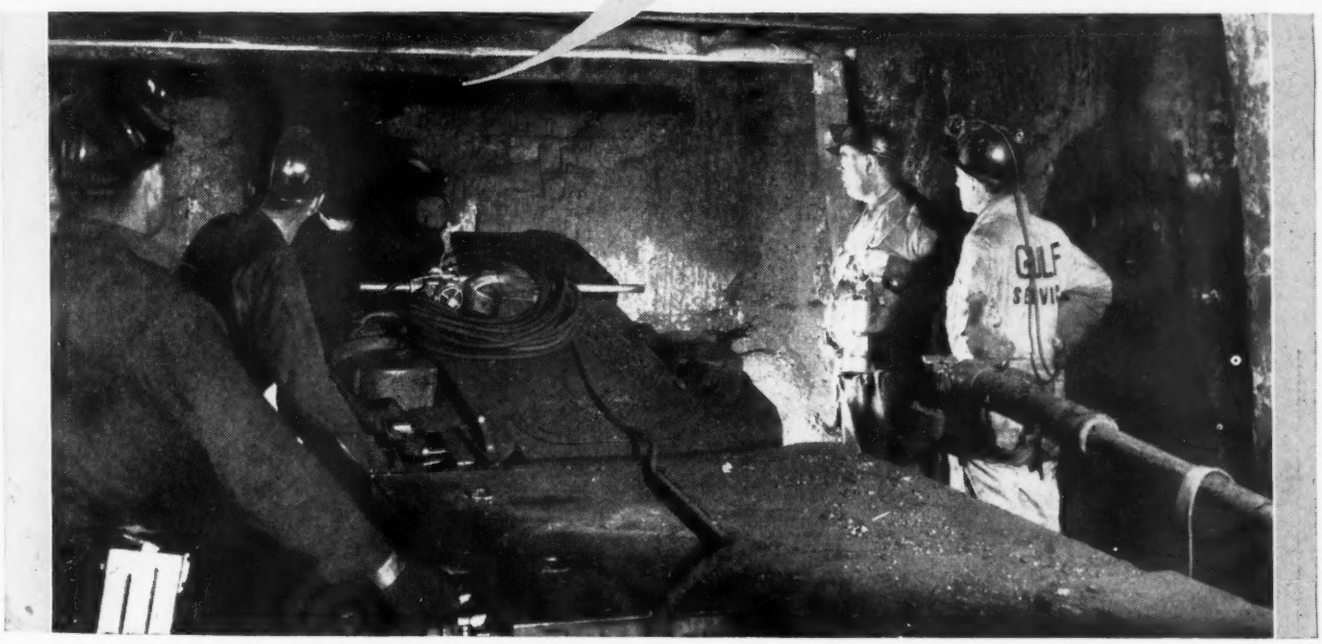
Long lasting, uniform, proper type for every requirement.

GULF LUBRICATION ENGINEERING SERVICE

A large staff of lubrication engineers with broad, practical experience, know-how—quickly available in 30 states.

GULF RESEARCH

Develops advanced new products, helps effectively to solve individual problems.



GULF offers effective help to you in three important ways: quality lubricants, co-operative engineering service, progressive research.

Let Gulf assist you in installing the kind of lubrication practice that means tangible benefits in your mine — more efficient performance of machines and equipment, less wear, greater tonnage, improved safety, and lower maintenance costs.

Make sure you are getting the advantages of all recent developments in scientific lubrication. Write, wire, or phone your nearest Gulf office today and ask a Gulf Lubrication Engineer to call.

Gulf Oil Corporation • Gulf Refining Company

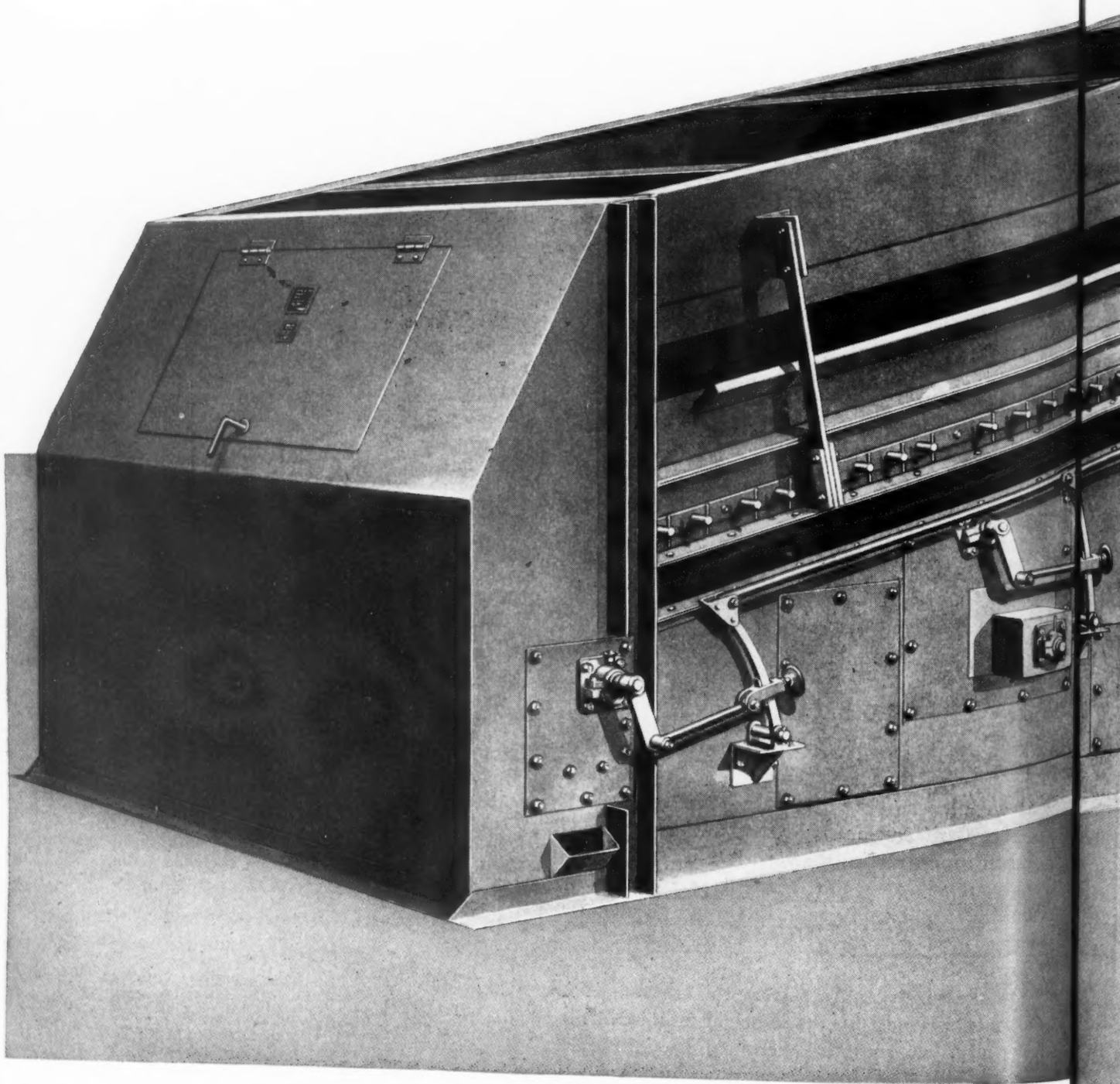
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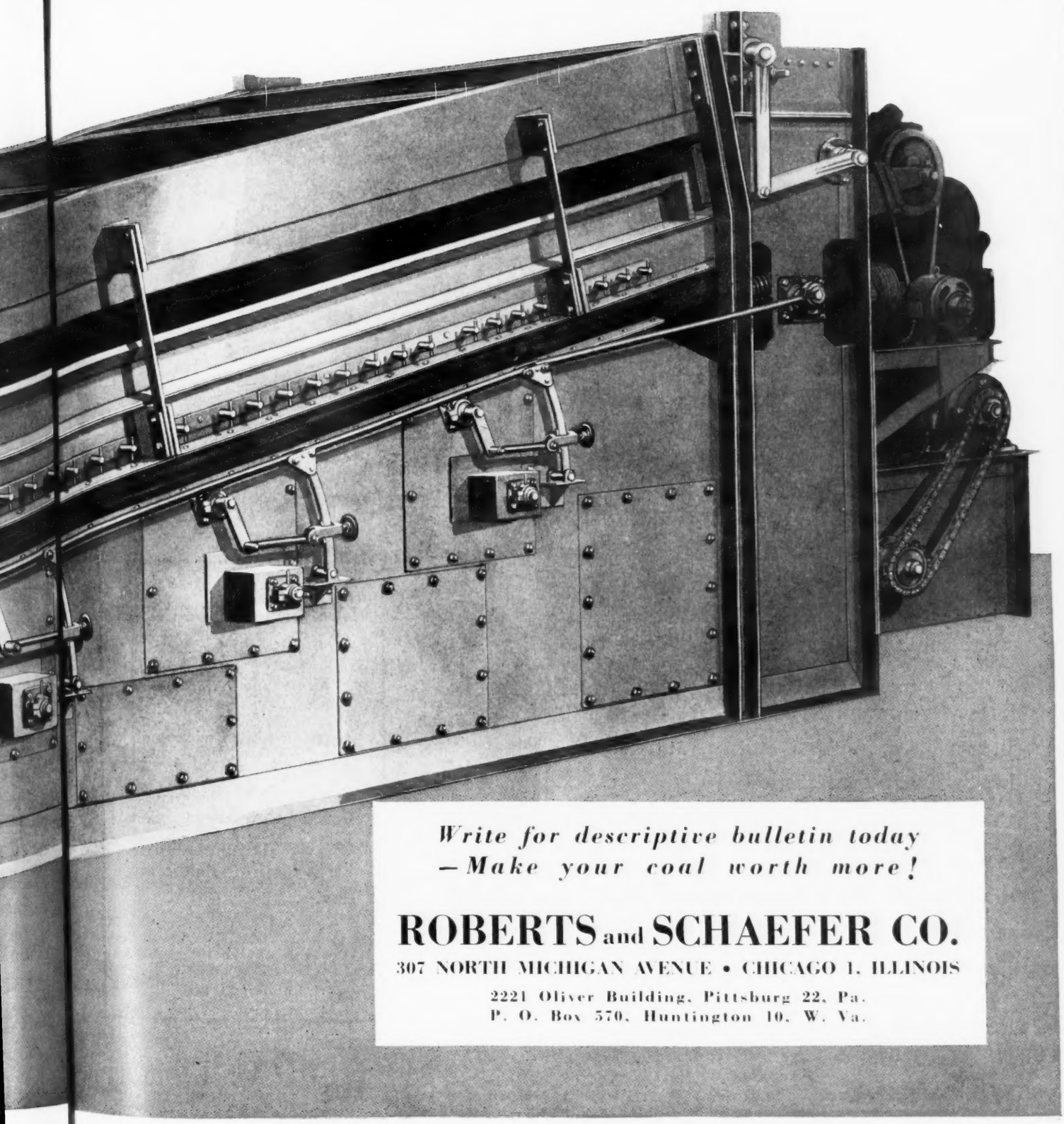
GULF INDUSTRIAL LUBRICATION

The NEW ROBERTS and SCHAEFER

for cleaning coal
smaller than 10 Mesh



SUPER-AIRFLOW



Write for descriptive bulletin today
—Make your coal worth more!

ROBERTS and SCHAEFER CO.

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P. O. Box 570, Huntington 10, W. Va.

ANACONDA ANNOUNCES

Securityflex Parallel mining cable in

NEW, SMALLER DIAMETER



Here it is, a new Securityflex parallel mining cable with ground wire that packs more cable on a reel, thanks to its new, smaller diameter—with the advantages of a tough, flame and abrasion-resistant Neoprene jacket . . . and unique, anti-short breaker strip construction.

Meeting all specifications of the Pennsylvania Flame Test, Securityflex is more than ever an investment in safe, continuous mine operation.

New Ground Wire Cable Ideal for Shuttle Car Service

Here is a ground wire parallel mining cable that will stand up under severe abuse: Breaker Strip construction cuts short circuits. This cable is ideal for shuttle car service.

ANACONDA *Securityflex* **CABLE**

ANACONDA
from mine to consumer

How to get full return on...

BIG DRAGLINE INVESTMENTS



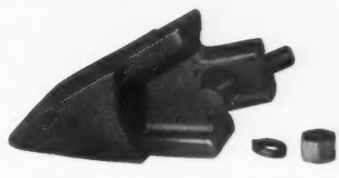
MAXIMUM returns on big dragline investments are dependent upon getting the best bucket available and using it correctly. Page Automatic Buckets have every feature for digging more yards at a lower cost per yard: Less Power to Pull; Easier Control; Easier Spotting; Less Maintenance; Perfect Balance; Full Loads in Shorter Distances and Less Operator Fatigue.

Page Automatics dig right in at the first pull on the load line because they always land in digging position and hold it even with all lines slack. Instant penetration at any depth, 20 feet to 100 feet — or more, assures full loads in any kind of digging in less than two bucket lengths. Perfect balance of the bucket helps the digging action. Teeth cannot be lifted off the ground by the pull line. For details send for Bulletin 1537.

PAGE ENGINEERING COMPANY
CHICAGO 38, ILLINOIS

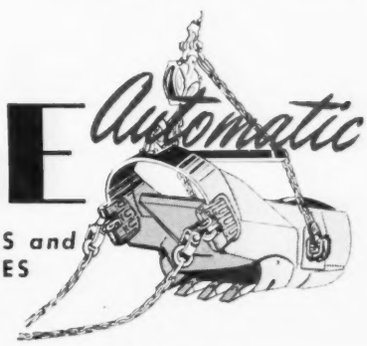
New Page Reversible Center Shank Tooth Points

These new Page Manganese tooth points will stay absolutely tight on the lip because the new hook bolt fastening prevents wearing and tearing of the bolt and also allows quick and easy replacement.



PAGE *Automatic*

DRAGLINE BUCKETS and WALKING DRAGLINES



Sales-Minded Executive's View of a Coal Preparation Plant . . . .

● He Sees Cars of Premium Priced Fuel Speeding to a Waiting Market

Top management looks beyond "today." Good seed is planted *now*, followed by a good harvest *tomorrow*.

That's why coal mine executives with vision give consideration to erection of modern coal preparation plants. Out of such plants, they see thousands of tons of specification coal "on its way" to waiting markets. It's clean coal, automatically washed, dried, and graded. It commands premium prices. It will meet tomorrow's rugged competition.

With such a preparation plant come new sources of revenue. Coal that now goes to the refuse pile can be rewashed and groomed into premium price fuel. Unpromising acreage, with coal full of impurities, can be turned, oftentimes, into a prosperous enterprise, its product elevated through preparation to the profit-making price class. Just a simple test of the raw coal in McNally Pittsburg laboratories will prove whether or not this can be accomplished.

McNally Pittsburg plants . . . large and small are dotted over the globe. Regardless of size, there's always an "in-the-black" operation. At your convenience, our technical staff will be glad to discuss turning your coal into a better burning, more profitable product.

(Preparation Plant of Tecumseh Coal Corp., near Boonville, Indiana)



McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—Works: Pittsburg, Kansas • Wellston, Ohio

Engineering & Sales Offices: Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

Production Executive's View of the Same Plant . . . .

He Sees Smooth Running Equipment Meeting Daily Tonnage Schedules

From the production man's standpoint, automatic preparation of specification fuel looks mighty good.

First, he'll be able to satisfy both his own sales department and consumer demands by boosting the tonnage output. He can produce 100 tph or up in the thousands of tons per hour at a cost for preparation of only a few cents a ton.

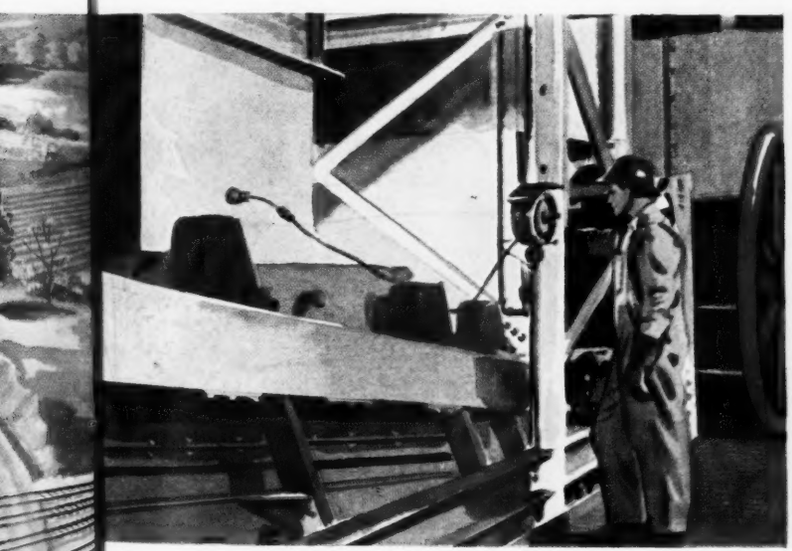
Second, he's relieved of staggering production worries. There's a maximum of coal recovery regardless of variations of refuse percentage in the raw coal feed. The washers automatically separate coal from refuse with the greatest accuracy, and control the ash content.

Automatic dryers squeeze out every ounce of free moisture. A touch of a push button, and loading booms are set in action. Cars move into position, are filled to capacity . . . all automatically.

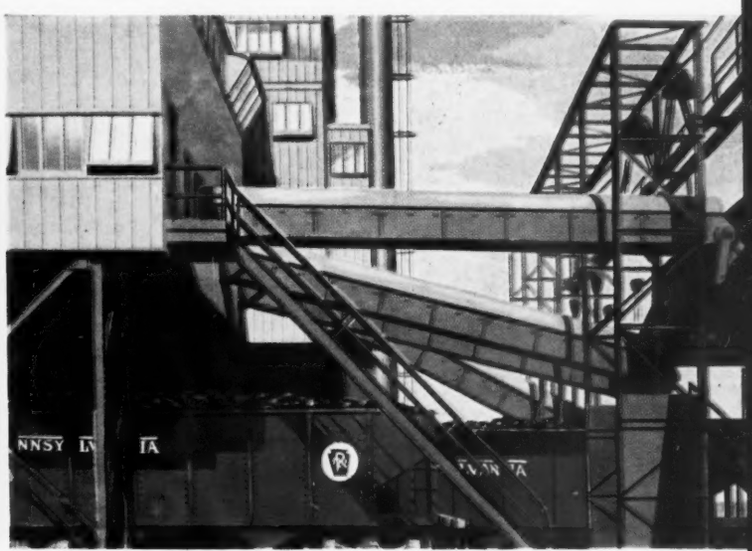
Yes, to a production man, a McNally Pittsburg preparation plant is a dream come true . . . coal washed free of impurities, turned into a desirable, clean product . . . just what the sales department demands.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL



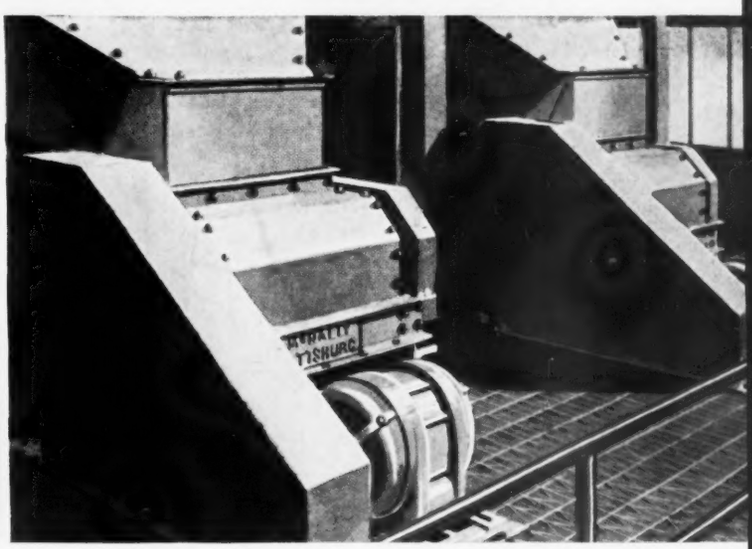
In the McNally-Vissac Dryers, wet coal from 2 in. down to ½ mm sizes is dried rapidly and economically. Dried sizes can then be screened and loaded as premium prepared stoker coal or blended with other sizes. A patented pulsator feature squeezes free moisture from coal, reducing necessary drying temperatures and saving fuel.



One man at a push-button station can operate a set of multiple loading booms, delivering coal of various sizes to the proper cars. He operates the car retarders, moving the cars into position to receive the load from the booms. Loading booms are manufactured in apron, flight, and rubber belt types; open or with canopy tops.

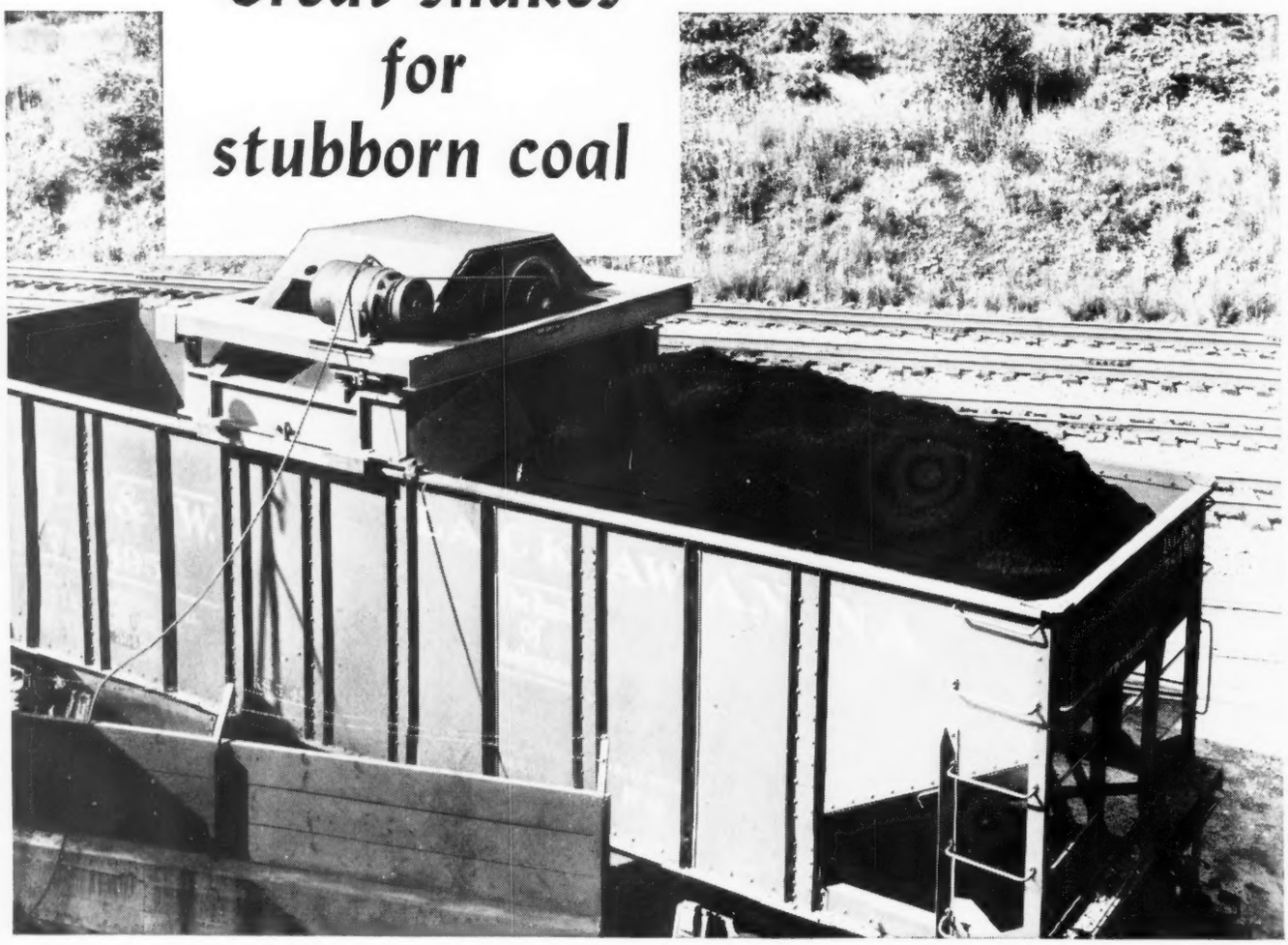


View through a section of the wash floor in a McNally Pittsburg-equipped plant. Plants produce upwards of 100 cars of washed coal a day. It is here that coal's impurities are removed in sizes from 6 in. down to 0 in. Power consumption of the washer is small. Units are compact . . . each part readily accessible for inspection.



With Stoker Coal Crushers, operators fill orders without delays. Three types . . . light, standard, heavy . . . in 17 sizes. They reduce egg and nut sizes to 1¼ in., 1 in., or ¾ in., with lowest possible production of fines. Also available are Primary Breakers in heavy and standard double-roll types for primary reduction of big lumps.

Great shakes for stubborn coal



Funny thing about coal. Send it on a train trip and it often gets stubborn about getting off the car.

Reason is that it settles during the trip—packs so tightly it won't flow out of the hoppers. Usually several men are needed to free the coal with sledges, pick axes and shovels.

This takes time—*lots* of it. It costs money! It ties up men, tools and cars . . . often a whole train, from engine to caboose. The same thing is true about unloading coke, ore, minerals and similar materials.

Couldn't something be done to break this bottleneck? Hewitt-Robins engineers set out to find a way. What they found is *great shakes for stubborn coal.*

It's the new Robins Car Shakeout, a giant shaker that shakes a car 1,000 times a minute. It quickly loosens 50 to 70 tons of stubborn material . . . unloads a car "broom clean" often in as little as 90 seconds. Only two men are needed.

The whole job is done in minutes, not hours —without injury to men or hopper car.

The Robins Car Shakeout is only one in a long list of products "Job-Engineered" by Hewitt-Robins—including materials handling equipment and hose, belting, and other industrial rubber products. Together, Hewitt Rubber and Robins Conveyors bring you a total of 138 years of combined experience.

Want to learn the rest of the story? How Robins Car Shakeouts are unloading stubborn materials with minute-hand timing wherever rails go? Just write to the Robins Conveyors Division, Passaic, New Jersey. No obligation!

HR **HEWITT ROBINS INCORPORATED**

RUBBER DIVISION, BUFFALO 5, NEW YORK

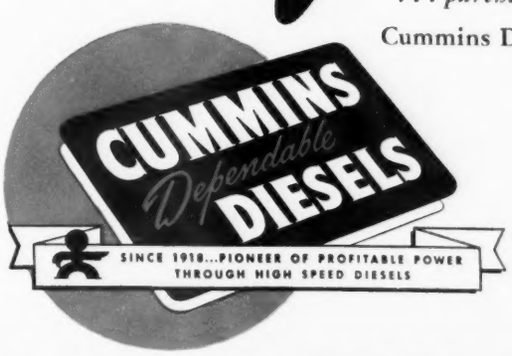
CONVEYORS DIVISION, PASSAIC, NEW JERSEY

Satisfaction...

. . . *derived from* a quality-built engine—
exclusive product of the pioneer high-speed
manufacturer.

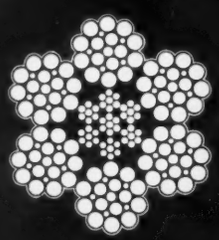
. . . *made certain by* a complete nation-wide
parts and service network.

. . . *purchased as* an intangible asset with every
Cummins Dependable Diesel.

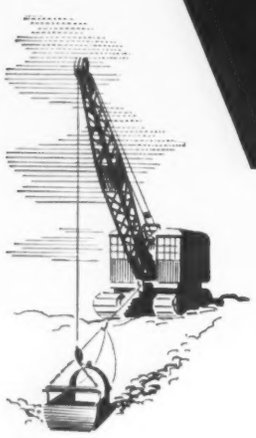


CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

Best for flexibility—and long wear!



UPSON-WALTON 6 x 16 FILLER WIRE CABLE



FOR drag cables on backfillers and dragline excavators . . . for cargo falls . . . for drag cables on drag scrapers . . . inclined shaft hoists . . . car and slope haulages . . . carry-all scrapers—*wherever* you need *BOTH* wear resistance and flexibility to a marked degree, Upson-Walton 6 x 16 Filler Wire Perfection Layrite is the ideal rope for your purpose.

This sturdy cable has *greater abrasion resistance* than 6 x 19 Filler Wire Rope, *greater flexibility* than 6 x 19 Seale. It is more flexible because there are a greater number of wires (21) used in its construction. It is better able to resist abrasion because the outer wires are larger in diameter.

Hemp center or, where operating conditions are very severe, IWRC (independent wire rope center).

Perfection grade—because this finest of all improved plow steels is the strongest, toughest and most resistant to wear of all the grades of wire used to make rope.

Layrite—because this fine *pre*formed wire rope results in longer life, greater safety and greater economy.

Specify Upson-Walton 6 x 16 Filler Wire Perfection Layrite wherever you need greater flexibility combined with longer wear!

Established 1871

Copyright 1946—The Upson-Walton Company



THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

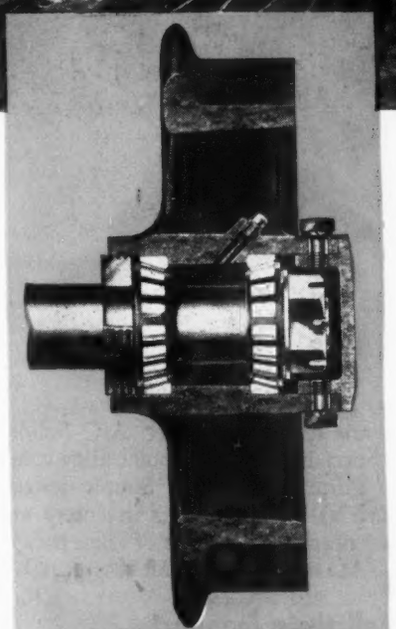
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114 Broad Street, New York 4 | 737 W. Van Buren Street, Chicago 7 | 241 Oliver Building, Pittsburgh 22

750 MINE CARS ROLL ON TIMKEN BEARINGS

at Westland Mine, Pittsburgh Coal Company





Standard application of Timken Bearings in mine car wheels.

Coal haulage at the Westland Mine of the Pittsburgh Coal Company is on a 100% Timken Bearing basis; 750 mine cars are in service here — all equipped with Timken Tapered Roller Bearings.

The first 500 cars went into operation in November, 1939; the remaining 250 cars were placed in service two years later. They are all-steel cars of the stub axle type, with a capacity of 198 cubic feet level full. All the cars were built by Carnegie-Illinois Steel Corporation, Johnstown, Pa.

Bearing performance has measured up to the best expectation of the mine operator and no bearing failures of any kind have been reported. Does it pay to operate Timken Bearing Equipped mine cars? More than 1,000 mine operators have proved it does — handsomely. They get out more coal per shift at lower cost per ton hauled.

Specify Timken Roller Bearings on your next new car order; look for the trade-mark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

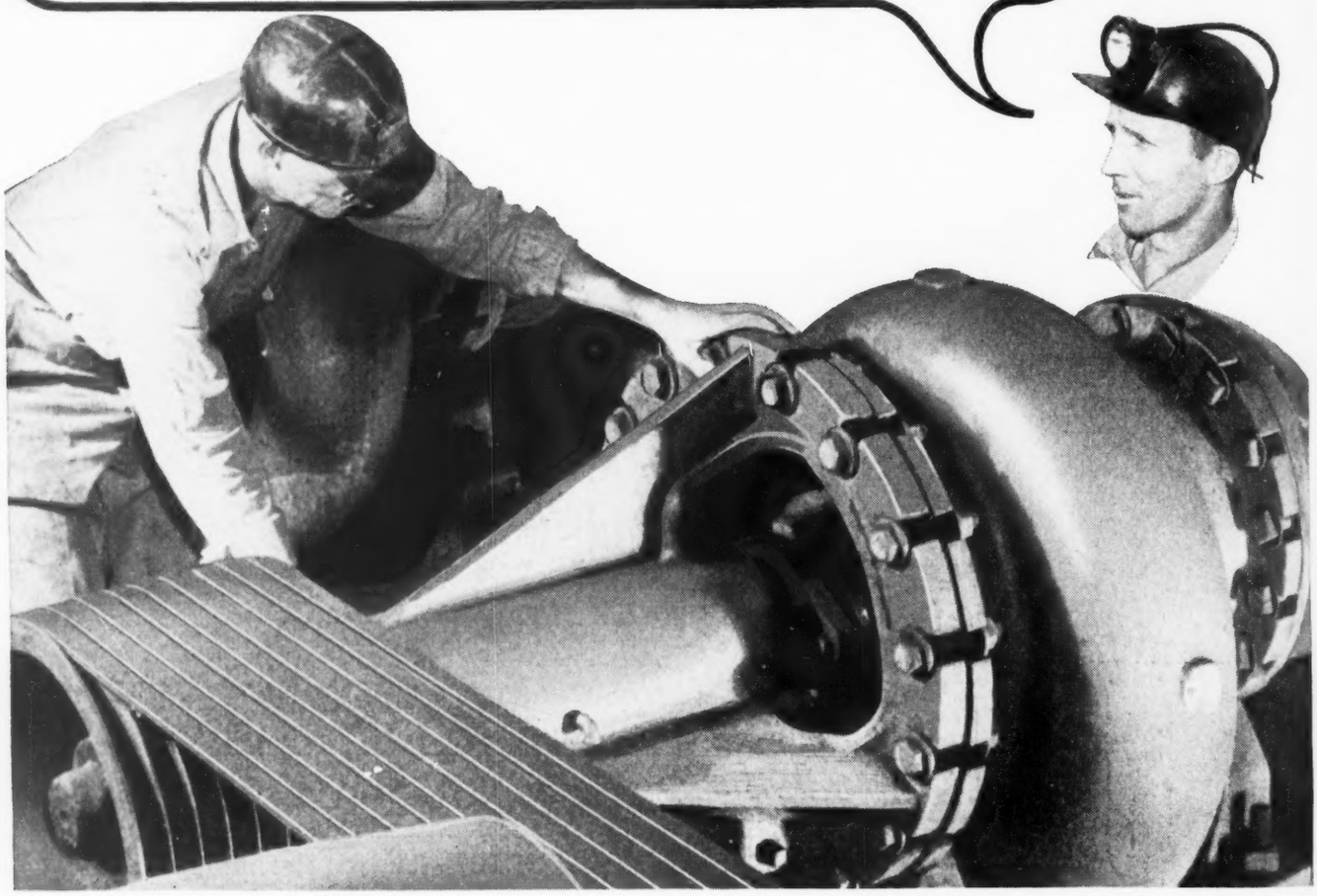
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←

"We want Trouble-free Operation in Solids-Pumps!"



" . . . and we're getting it! — pumping 7,000 gallons per minute with each of our three new A-C Solids Pumps" — says Kentucky Coal Operator.

WE HAD PLENTY OF TROUBLE pumping solids in one of our tipples. Pumps needed constant repair . . . downtime was slowing production . . . robbing profits. Then we replaced those pumps with Allis-Chalmers Solids Pumps and *haven't had a single minute of downtime since!*

That's why we specified A-C Solids Pumps for our new coal cleaning plant — and again we are able to report *not a single minute of downtime!*

Results like these are typical wherever A-C Solids Pumps are installed. Special abrasion-resistant alloy construction insures up to 4 times longer life! Simple design cuts downtime as much as 80% — parts inventory as much as 70%. Contact nearby A-C dealer or office today or write for 08B6381—ALLIS-CHALMERS, MILWAUKEE 1.

COMPARE SOLIDS PUMPS! No other pump can give you all these features!

Special abrasion-resistant alloy construction insures longer pump life.

Easy access to working parts simplifies maintenance — cuts downtime.

Entire rotating element can be removed without disturbing piping . . . simplifies maintenance.

Fewest total working parts to wear out — reduces repair costs, parts stock.

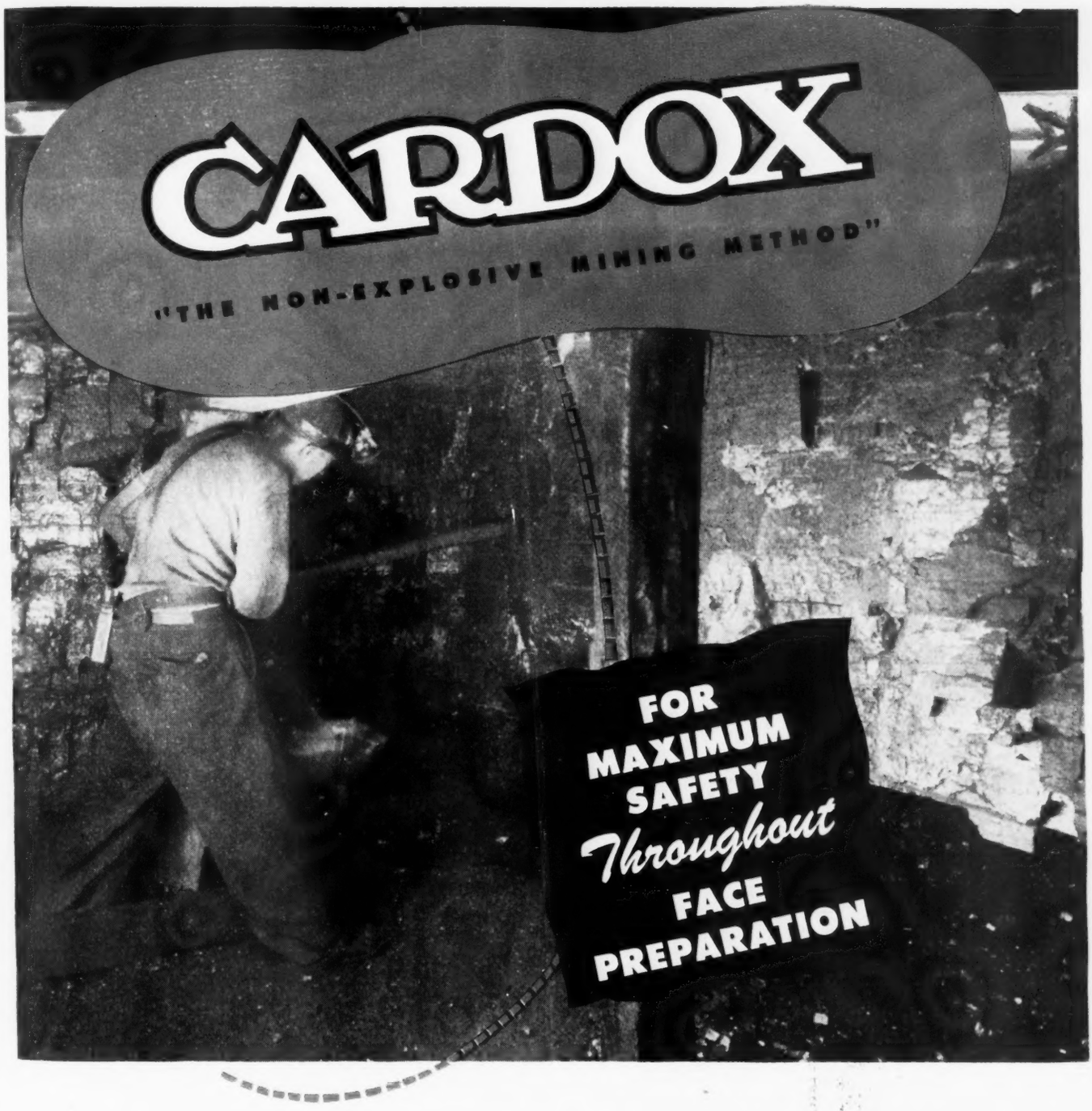
Pump design allows 7 discharge angles 45° apart without complicated piping arrangements.

A 2143

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great



CARDOX mining is unquestionably the safest method of face preparation known. Proof of its safety is found in the fact that . . . while widely used in gassy and dusty mines . . . the discharge of a Cardox Tube has never been known to ignite either gas or dust. In fact, Cardox Tubes make efficient emergency fire extinguishers. The carbon dioxide stored in a Cardox Tube smothers fire fast . . . penetrates where water or rock dust cannot reach . . . does not damage electrical equipment or other machinery.

The mild heaving shearing action of Cardox also reduces roof-failure hazards—squares up both face and rib so that dangers resulting from overhanging face in high seams are greatly reduced. It removes the hazards of storing and handling explosives.

Write for full details on free demonstration of CARDOX safety and profit features in your own mine.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

Saves precious

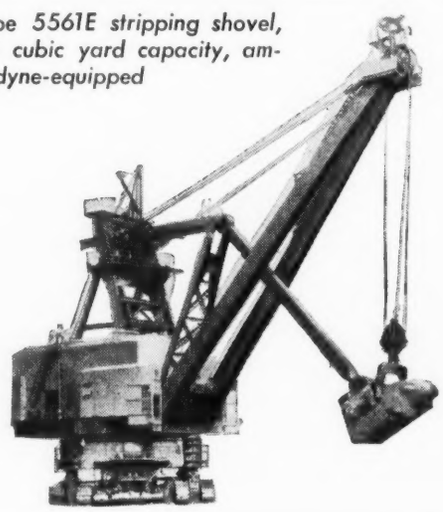


between here...

Type 1050B stripping shovel, 33 cubic yard capacity, amplidyne-equipped



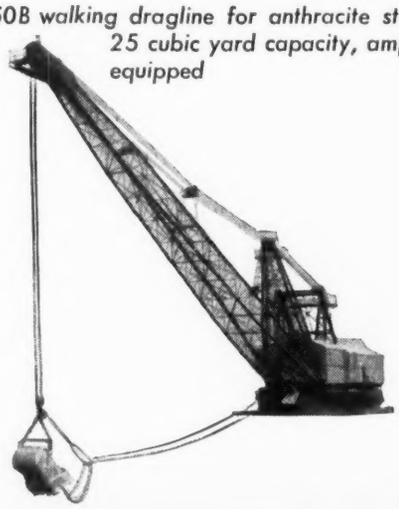
Type 5561E stripping shovel, 35 cubic yard capacity, amplidyne-equipped



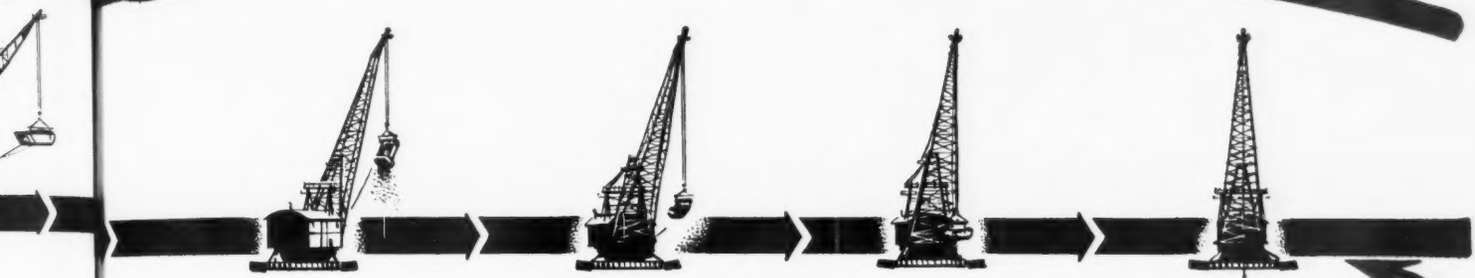
Type 151M loading shovel, 6 cubic yard capacity, amplidyne-equipped



Type 1150B walking dragline for anthracite stripping, 25 cubic yard capacity, amplidyne-equipped



Seconds...



...and here

G-E Amplidyne control for electric excavators gives you faster cycles — greater tonnage per machine — lower stripping costs!

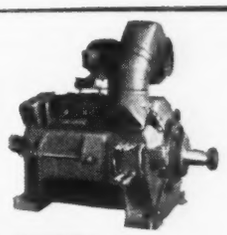
It happens whenever an electrified shovel or dragline comes on to a stripping. Yardage records are broken—overall costs go down. A large part of the credit must go to the General Electric Amplidyne—heart of the control system that has helped in no small way to make coal stripping a profitable operation. The reasons?

FIRST—Amplidyne control gives your operator a swifter, surer touch. Motors respond almost instantly to his signals. Fast acceleration and deceleration cuts precious seconds off hoist, swing, and crowd (or drag) motions. Operating cycles are shorter, daily tonnage handled is higher.

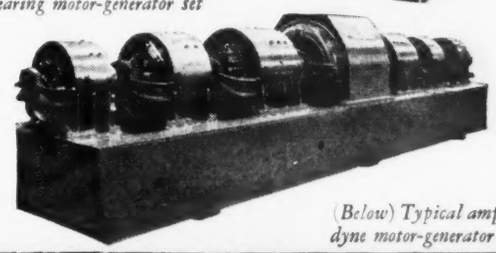
SECOND—Equipment downtime is smaller because stress on pinions and front-end strain is kept to a minimum. The Amplidyne acts as a regulator and even at high speeds, prevents the excessive current and torque peaks which damage electrical and mechanical machinery.

THIRD—Amplidyne is basically simple. Fewer control devices are used in an Amplidyne control system. They need less maintenance—require less space—stay on the job longer. General Electric has equipped more than 2000 shovels and draglines with electric drive. For the past five years, the modern Amplidyne control has been a feature of nearly all large shovels and draglines equipped by General Electric. Without exception, owners of these electrified excavators have benefited from smoother, faster operation and greater shovel capacity per day. When you specify electrical equipment for your next shovel, make sure it is Amplidyne-equipped. Simply get in touch with your nearest General Electric field office for information and assistance. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

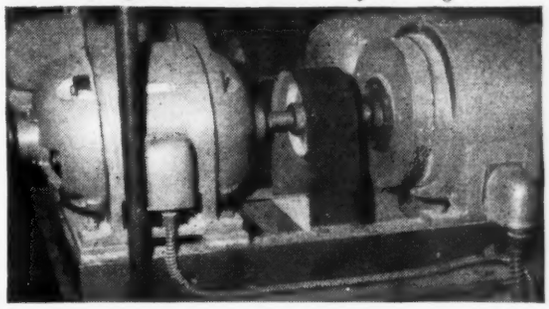
(Right) Type MDP mill motors provide great mechanical strength coupled with improved electrical characteristics



(Below) 7-unit a-c to d-c ball-bearing motor-generator set



(Below) Typical amplidyne motor-generator set



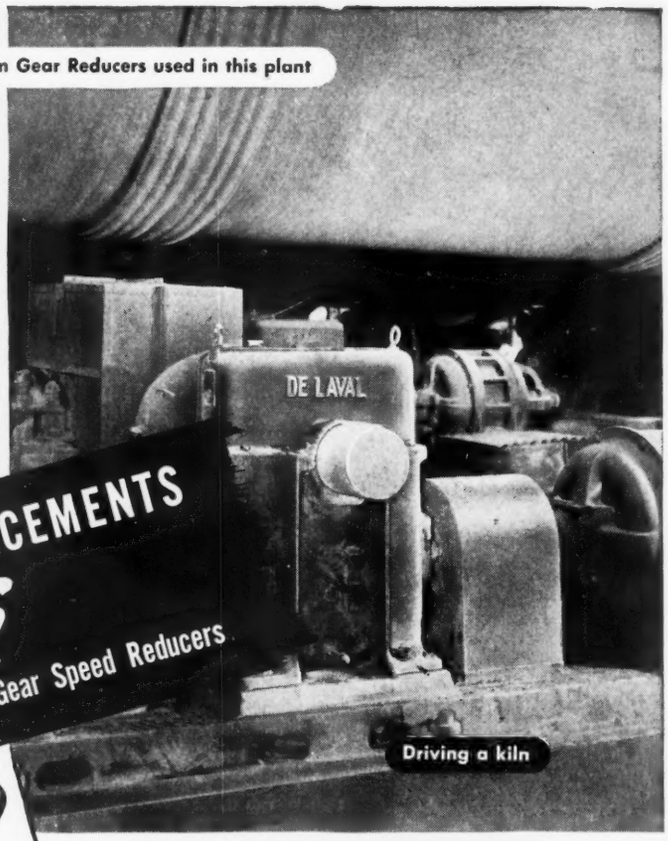
GENERAL ELECTRIC

657-69

A few of the many De Laval Worm Gear Reducers used in this plant



Driving a kiln feeder



Driving a kiln

PRACTICALLY NO PARTS REPLACEMENTS *in 19 YEARS*

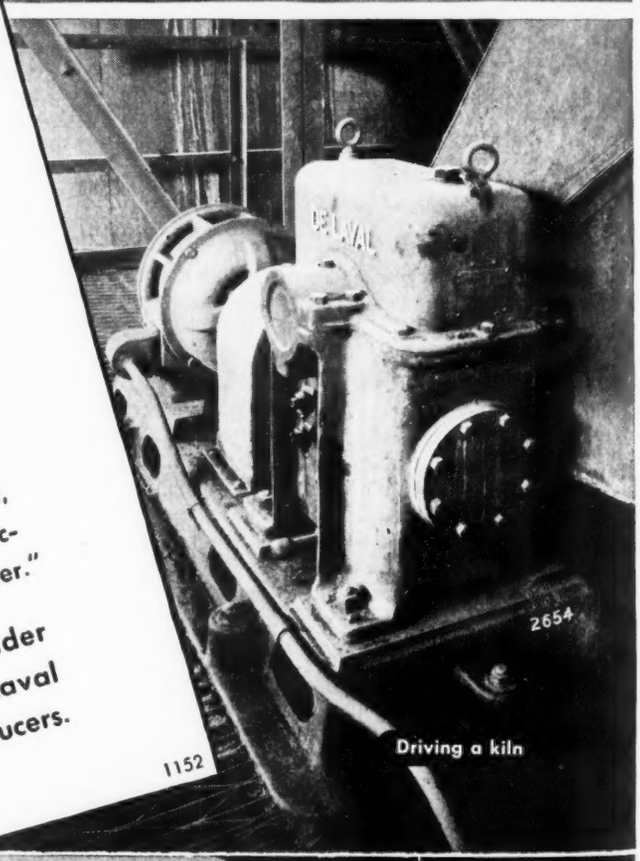
Reported by Plant Employing Many De Laval Worm Gear Speed Reducers

How's that for Reliability?

De Laval Worm Gear Speed Reducers have given such good service in a certain cement mill (name furnished on request) that the Plant Superintendent has written of their performance:

"There are about 175 reducers of various sizes in operation in this plant on a wide diversity of jobs; and during the last eighteen or nineteen years, since the original ones were installed, we have had to make practically no replacements of worms, wheels or bearings. In fact, there has never been any interruption in production by reason of the failure of a speed reducer."

For reliable, trouble-free service under severe conditions, specify De Laval Worm Gear Speed Reducers.



Driving a kiln

1152

TURBINES • HELICAL GEARS and WORM GEAR SPEED REDUCERS CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS and COMPRESSORS • IMO OIL PUMPS

WORM GEAR DIVISION

DE LAVAL

STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY

SALES OFFICES ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER DETROIT • HELENA • HONOLULU • HOUSTON KANSAS CITY • LOS ANGELES • MANILA MONTREAL • NEW HAVEN • NEW ORLEANS NEW YORK • PHILADELPHIA • PITTSBURGH ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA VANCOUVER • WASHINGTON, D. C. • WINNIPEG And Cities in Central and South America

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE

MOISTURE RESISTANT





MOISTURE ABSORPTION TEST



Conductor Insulation: 9" of insulated conductor are immersed in distilled water at 70° C for 7 days. Conductor is then removed, weighed and amount of water absorbed calculated from the increase in weight. Moisture absorption must not exceed 25 milligrams per sq. in.

Jacket Compound: Sample of jacket compound of uniform 0.100-inch thickness with surface material removed is first weighed, then immersed in distilled water at 70° C for 7 days. It is then removed and weighed and the amount of water absorbed is calculated—Jacket absorption must not exceed 60 milligrams per sq. in.



You need never worry about moisture affecting U. S. Royal Cords and Cables. Their moisture-resistance has been thoroughly proved by a rigorous immersion test in U. S. Rubber laboratories.

Furthermore, in a series of tests which exaggerate actual conditions, U. S. Royal Cords and Cables are bent, twisted, stretched, pounded, and exposed to flame. The dependability is *proven in advance,* precisely and scientifically.

When it's a question of safety, don't gamble with untested, unproven electrical cables. Specify U. S. Royal, Safety-Tested Cords and Cables.

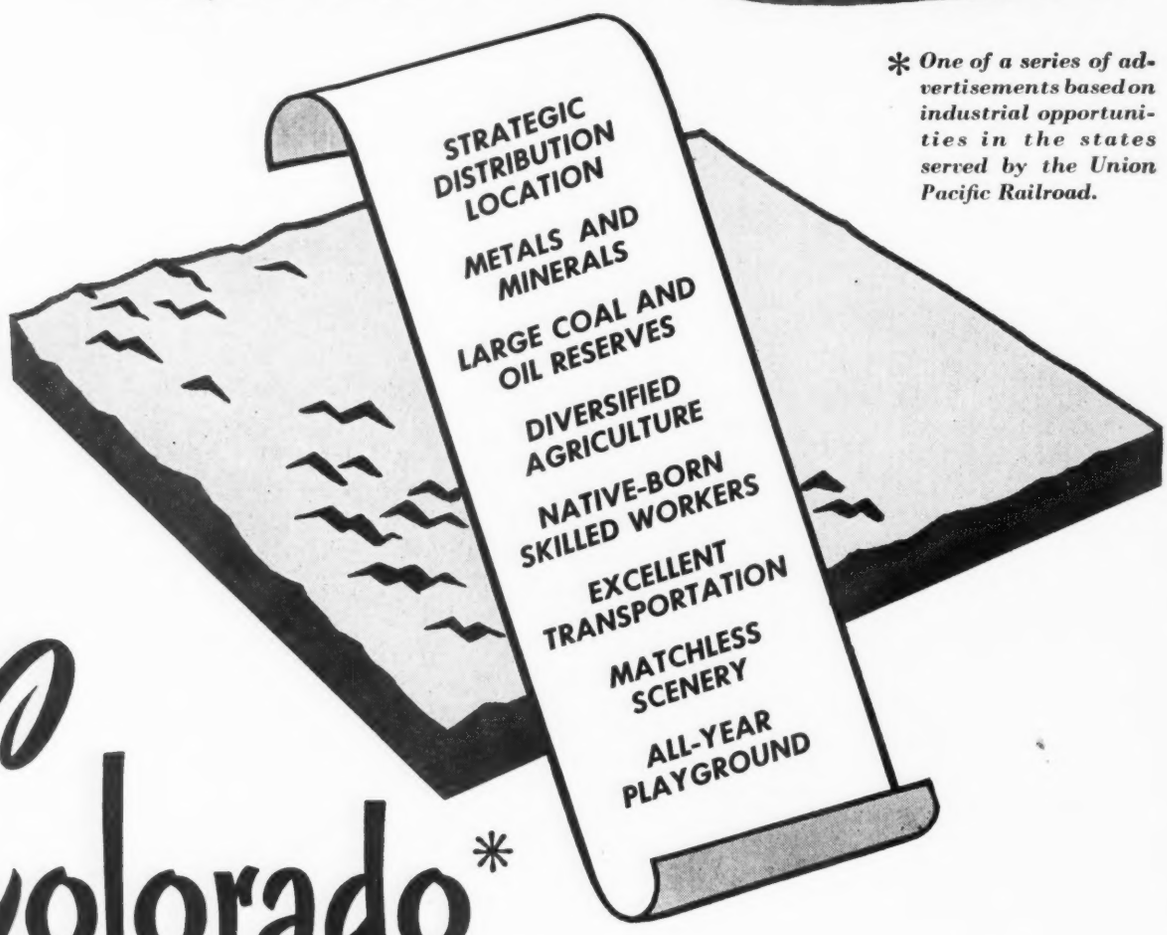
THE NEW U. S. ROYAL *Safety Tested*

MINING MACHINE AND LOCOMOTIVE CABLES

UNION PACIFIC

TREASURE MAP OF INDUSTRY

* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*



Colorado*

Colorado offers industry many desirable sites for manufacture, distribution, warehousing, and other purposes. It is strategically located for national distribution.

Diversified agricultural products are of high quality due to favorable climate and soil.

More than 250 useful metallic and non-metallic minerals and compounds have been found, including precious uranium. Timber, oil and coal are practically unlimited.

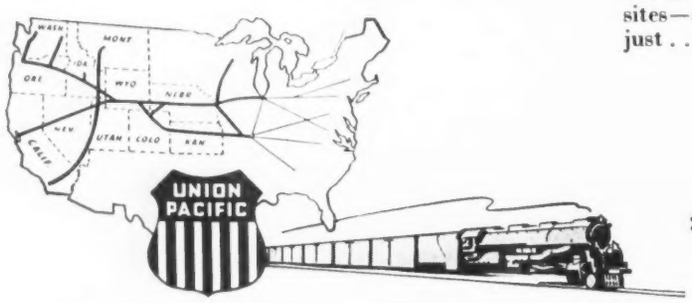
Native-born skilled labor, and a healthful climate resulting in fewer "time-outs" assure economical production.

Colorado provides sound state economy, modern educational and cultural facilities.

Thousands of vacationists enjoy its mountainous splendor, cool summer breezes and winter sports.

Union Pacific provides Colorado with unexcelled freight and passenger transportation. Every night, over night Streamliner service between Denver-Chicago . . . Denver-St. Louis.

For assistance in securing industrial and commercial sites—and for all-weather, dependable rail service, just . . .

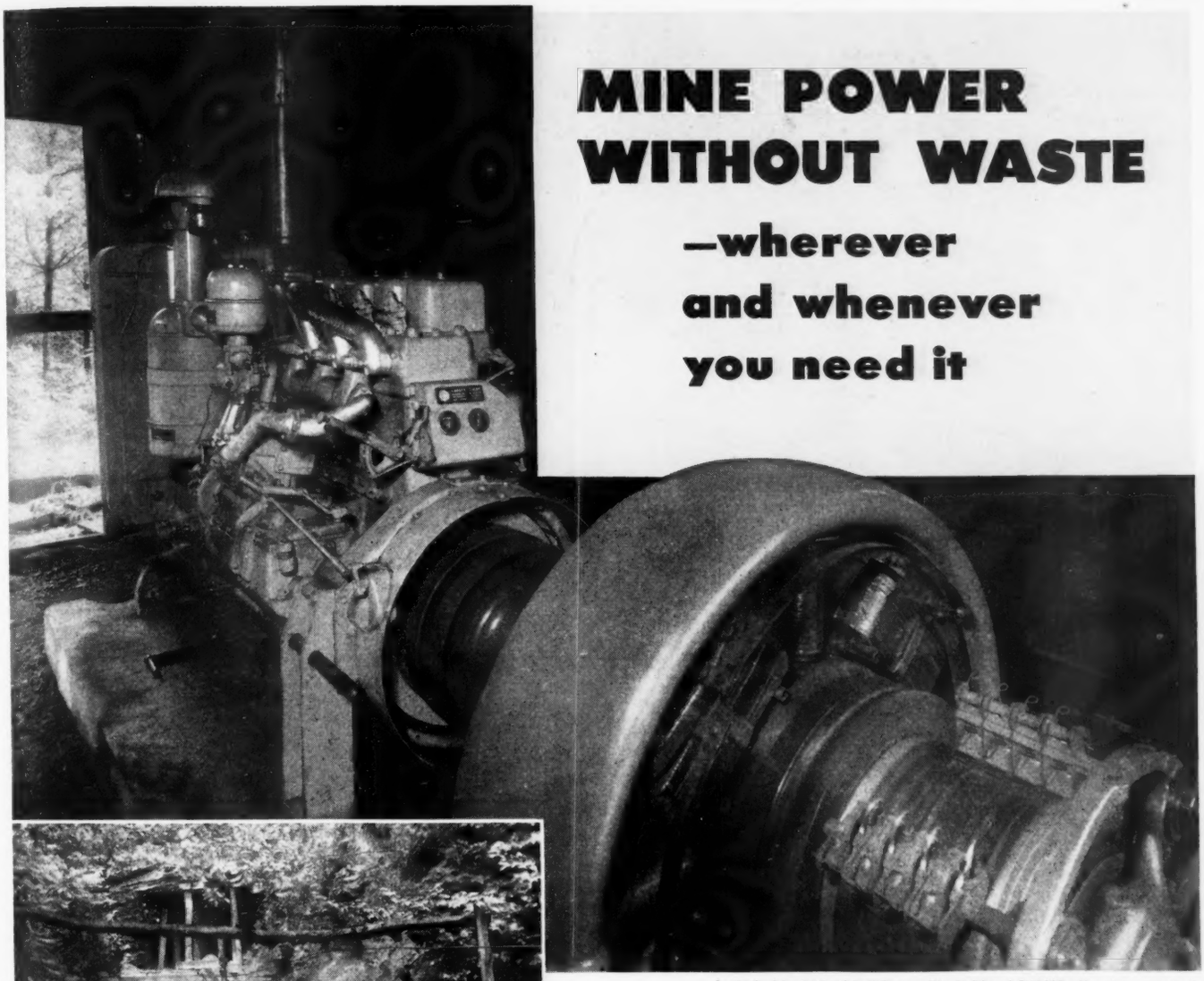


be Specific – say "Union Pacific"

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE



MINE POWER WITHOUT WASTE

—wherever and whenever you need it

Installed in 1941, this "Caterpillar" Diesel D13000, direct-connected to 65-kw. generator, furnishes all power needed to drive machinery in Shaffer Coal Company's mine at Windber, Pa. Output, 200 tons per day. Engine operates 8 hours daily; uses about 2 gallons of low-cost fuel per hour.

Independently generated electricity, with a simple, rugged, dependable "Caterpillar" Diesel Engine (or self-regulating Electric Set) is the modern way to convenient and economical mine power.

Easy to set up; easy to transmit to drills, jack-hammers, lights, mine locomotives, breaker and car-loading equipment. Requires no full-time or highly trained attendants, is easy to service, costs little for fuel and maintenance, incurs no demand charges when idle, and has such slow, long-life depreciation that it is proving the cheapest form of power the mine operator can use.

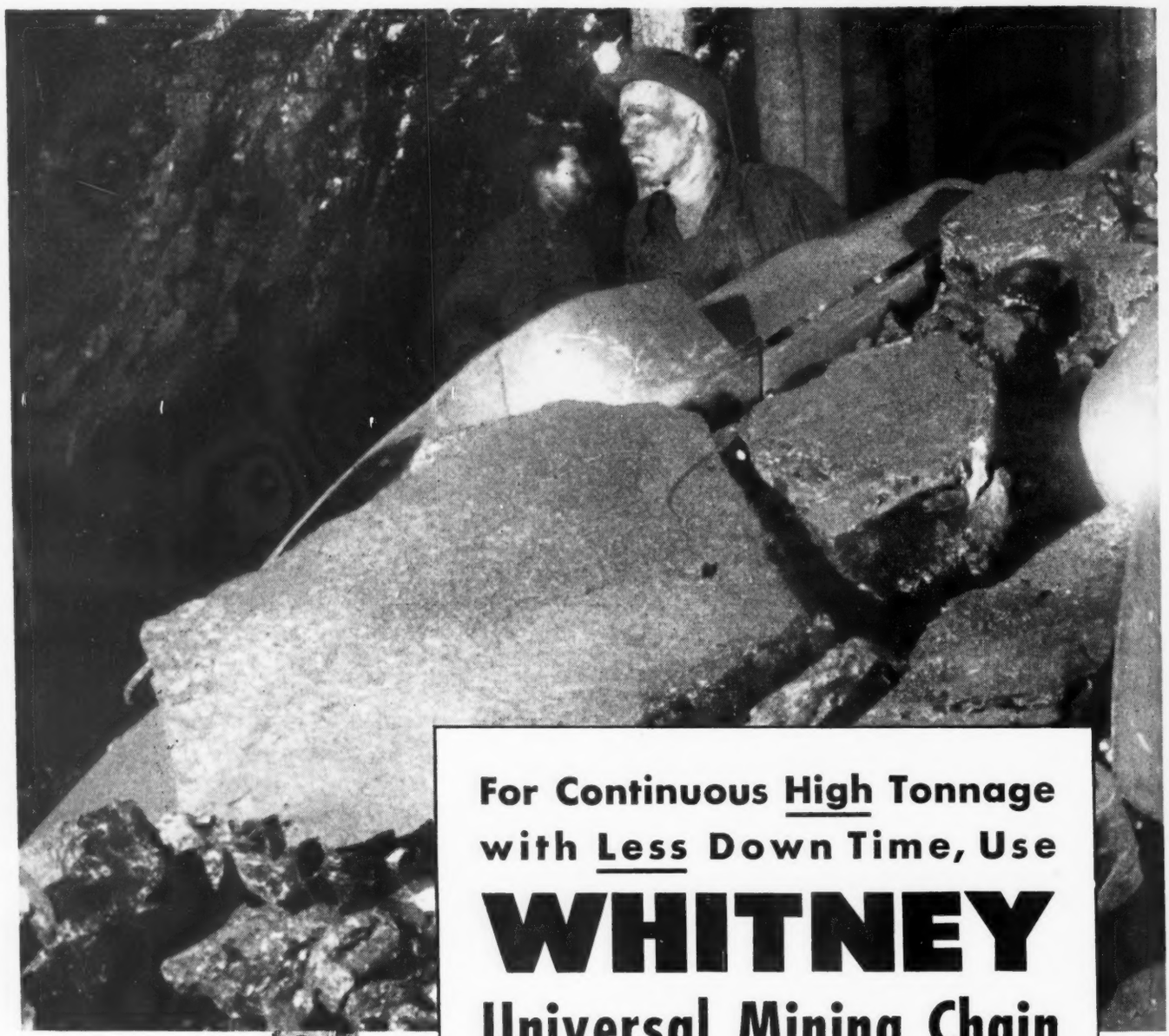
CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES

TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



For Continuous High Tonnage with Less Down Time, Use

WHITNEY

Universal Mining Chain



Where the going is tough, that's where Whitney Universal Mining Chain proves its superiority by out-performing, out-lasting ordinary chain.

For like all Whitney Chains, they're especially made to give long-lasting service in loaders no matter what the working conditions. All parts are made of alloy steel, heat-treated for extreme toughness and durability. The universal joints are made of alloy steel forgings, accurately machined. Flight studs are fully machined and have milled threads. End pins are fully riveted into deep counter-sink in the forging to provide maximum anchorage.

Keep your equipment up-at-the-face producing . . . equip your loaders with Whitney Universal Mining Chains. They will give top performance and save you money with their long operating life.

See the Whitney Distributor serving your territory or write:

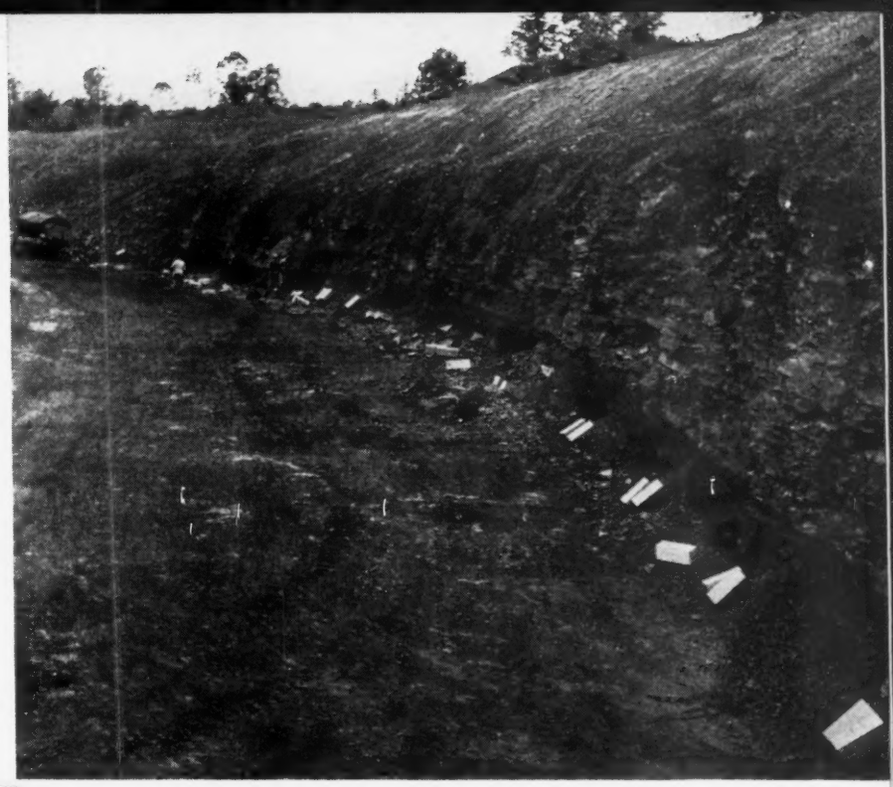
The WHITNEY Chain & Mfg. Co.

Your Assurance of Proven Power Transmission and Conveying Since 1896

HARTFORD 2, CONNECTICUT

These Advantages of "NITRAMON" Help Stripping Operators

ET OUT MORE COAL —FASTER



Typical 40-foot shale and limestone overburden of stripping operation in western Pennsylvania, as 17-hole shot is loaded.



½-inch "Nitramon" Primer with Primacord attached is fely loaded into horizonta! hole 36 feet deep.



After shot was fired. Splendid fragmentation obtained ith "Nitramon" helps speed removal of rock.

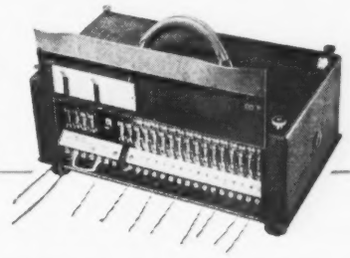
Du Pont "Nitramon" is an ideal blasting agent for coal stripping operations. Check these important reasons why:

1. **Safer.** "Nitramon" is safe to handle; safe to load. Cannot be detonated by the strongest blasting caps, open flame, friction, Primacord or even impact of rifle bullets. Yet it is readily fired with "Nitramon" Primer . . . itself relatively insensitive.
2. **Convenient.** "Nitramon" comes packed in easily handled metal containers that help speed loading. Charges of required strength can be easily made up.
3. **Water-resistant.** The containers of "Nitramon" are watertight and can be safely loaded in horizontal or well-drill holes well in advance of firing and whether conditions are wet or dry.
4. **Powerful.** "Nitramon" packs the power to do a thorough job of breaking up the over-burden.
5. **Non-headache-producing** . . . a benefit that insures clear-headedness, helps eliminate delays, and aids in keeping the work on schedule.

"Nitramon" has long been the choice of blasters in many fields. It promotes safety and efficiency. Ask any Du Pont Technical Representative to explain how this safest blasting agent may help you get out more coal—faster. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

(AT RIGHT) Du Pont Blasting Timer* facilitates short interval delay shots with Primacord and instantaneous caps. Reduces vibration. Increases safety. Improves fragmentation.

*PAT. APPLIED FOR



DU PONT "NITRAMON"

A Product of Du Pont Explosives Research

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

Big Savings! . . . through High-tonnage hauling with

WALTER TRACTOR TRUCKS



IN OPEN-PIT coal and iron mining, Walter Tractor Trucks are hauling 30—40—up to 60-ton payloads. These huge loads are hauled at speeds equalling smaller trucks. Each trip from shovel to dumping point delivers much greater tonnage per truck, per driver. Fewer trucks are needed, reducing congestion and maintenance.

More than that, Walter Tractor Trucks haul unfailingly in any running conditions—on or off the road, in good or bad weather, up steep grades. They are highly maneuverable, easily handled, safe . . . due to short wheelbase, short turning radius, power hydraulic steering and air brakes.

The greater haulpower of Walter Tractor Trucks comes from the exclusive 4-Point Positive Drive, which provides 100% non-spin traction through three automatic locking differentials. This feature also minimizes wear and tear on roads and tires.

Learn more about these outstanding Walter Tractor Trucks. Have one of our haulage engineers call, without obligation. Write for detailed, illustrated literature.

WALTER MOTOR TRUCK CO. • 1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, L. I., N. Y.

CUSHION DRIVE

provides long life . . . smooth operation



La-Del Shakers

move tonnage economically under easy or difficult conditions



La-Del Shaker Conveyors are well adapted to bituminous or anthracite mining conditions. Length and intensity of stroke may be adjusted to a great degree . . . thus permitting use of a standard drive for all classes of material.

Inclines up to 15% may be traversed—over rolling and dipping mine bottoms—without spilling. La-Del Shakers make 90° turns or less, carrying the largest lumps or fines without spilling.

Cost-Saver for Conveyor Mines





Consult a Joy Engineer

AD CL 1078

La-Del DIVISION

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING . PITTSBURGH, PA.



Thor SINKER ROCK DRILLS

SOME BLOW! Thor Sinker Rock Drills excel in hole-cleaning capacity—and here's why: "straight-line" design delivers controlled air straight through the heart of the tool *at full pressure.* Teamed up with a *harder hammer blow,* "straight-line" design means faster penetration, more footage per shift. *Prove this to yourself on your own jobs. Call your Thor dealer for a demonstration.*



Thor Sinker Rock Drill (Model 75—Heavy Duty)

INDEPENDENT PNEUMATIC TOOL CO.
600 W. Jackson Blvd., Chicago 6, Ill.

Birmingham Boston Buffalo Cincinnati Cleveland Denver Detroit Houston
Los Angeles Milwaukee New York Philadelphia Pittsburgh St. Louis St. Paul
Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

SERVING THROUGH SCIENCE

EXTRA SHOCK PADS

protect this husky trio from costly impact injuries!



U. S. ROYAL *Con-Trak-Tor*

This strong, rugged "mucker" tire has a deep cleated tread, insuring maximum two-way traction. Center running rib assures longer wear, easier steering.

U. S. ROYAL *LOGGER*

Its tough, strong body resists ruptures and impact injuries. Self-cleaning design maintains maximum traction, prevents rock retention. Center running rib adds mileage.

U. S. ROYAL *Fleet Delivery*

Extra long mileage results from the deep, flat, non-skid, slow-wearing tread. Center running rib makes steering easier. Shoulder design resists curb and rut scuffing.

Under the tread of these rugged U. S. Royals there are *two extra* shock pads to guard against sudden impact injuries... to unite the tread and tire body into one resilient unit . . . to protect against fabric breaks and separations.

Each tire has the *added* strength of exclusive "U. S." Safety Bonded Cord construction . . . and in each the tire body is attached to the steel wire beads by a specially designed bead anchoring that rigidly ties the beads to the tire itself.

When it comes to the *tread*, each is field-designed to *deliver the goods* on the job for which it is built!

U.S. ROYAL TIRES

FOR EVERY TIRE THERE'S A U. S. ROYAL BUTYL TUBE

UNITED STATES RUBBER COMPANY

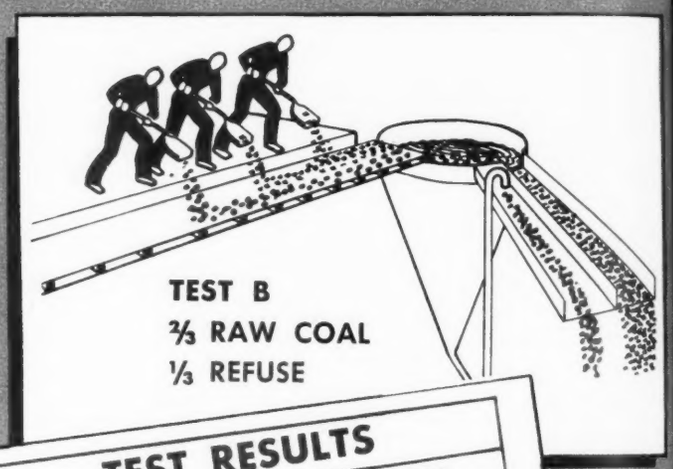
1230 Avenue of the Americas • Rockefeller Center • New York 20, N. Y.



THE TREND UNDERGROUND

FULL-SEAM EXTRACTION
HIGH-SPEED LOADING
COMPLETE MECHANIZATION
SAFE LOW-COST MINING





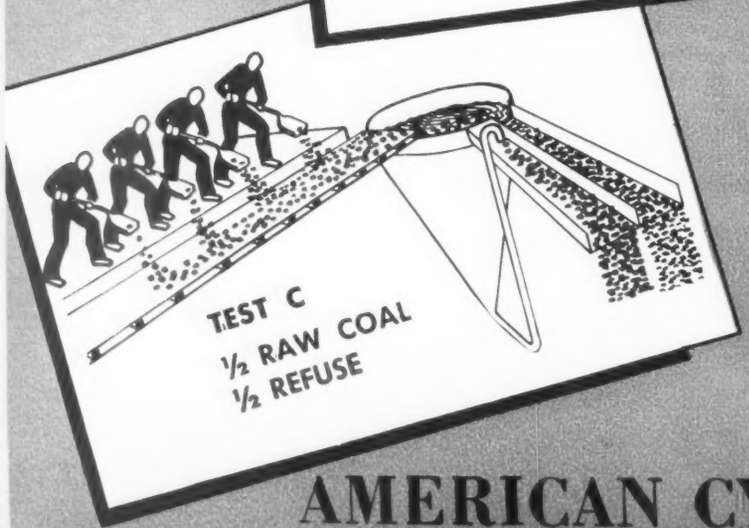
FLOAT-SINK ON FEEDS

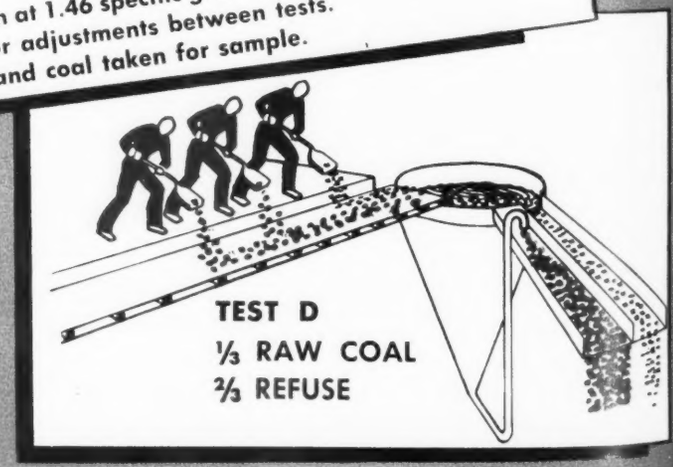
	RAW COAL	ADDED REFUSE
Float 1.41	85.17	..
Float 1.46	1.77	2.80
Float 1.51	1.05	10.84
Sink 1.51	12.01	86.36
± .05 at 1.46	2.82	13.64

TEST RESULTS

TEST	FEED ±0.05	COAL % WT.	COAL % 1.46 SINK	REFUSE % WT.	REFUSE % 1.46 FLOAT
A	2.82	87.15	0.33	12.85	0.59
B	6.52	55.10	1.25	44.90	0.23
C	8.33	38.30	0.20	61.70	0.70
D	10.05	24.27	0.81	75.73	0.61

Separation at 1.46 specific gravity.
No changes or adjustments between tests.
All refuse and coal taken for sample.





AMERICAN CYANAMID COMPANY



POSES THIS **PROBLEM** FOR PREPARATION ENGINEERS

HIGH AND FLUCTUATING REFUSE-CONTENT IN RUN-OF-MINE COAL

TO WHICH THERE IS ONE LOGICAL

ANSWER

EFFICIENT CLEANING WITHOUT LOSS OF CAPACITY DESPITE EXTREME FLUCTUATIONS IN THE REFUSE CONTENT

ONLY HEAVY-MEDIA SEPARATION CAN COPE WITH LARGE AND VARIABLE QUANTITIES OF REFUSE IN RUN-OF-MINE COAL WITHOUT LOSS OF CAPACITY OR CLEANING EFFICIENCY

Reason? Only Heavy-Media Separation provides continuous withdrawal of refuse *without volumetric limitation!* Tonnage never need be cut back or off-quality coal shipped because too much refuse starts coming up from the mine.

Proof? Scan the test results on the page opposite—large-scale pilot plant tests made on coals purposely adulterated to be far below commercially-mineable grade.

Then remember: In existing plants, Heavy-Media Separation has treated millions of tons of ore from which the *sink removed runs three times the tonnage of the float.*

Heavy-Media Separation closely duplicates washability curves . . . making a razor sharp separation within a gravity range of 1.25 to 3.40 . . . maintaining any pre-determined density continuously within ± 0.01. No other process approaches this efficiency. Yet, if specifications change, the separating gravity can be quickly and easily adjusted.

For all these advantages, Heavy-Media Separation carries no compensating penalties. By continuous reclamation, loss of the low-cost separating medium is negligible. Equipment is standard, time proved. Operators need no unusual skills. Labor costs per ton are infinitesimal. Capital costs permit use on any seam worth mechanizing!

Cyanamid stands ready to run carload lot tests on your coal; to help your engineers design a Heavy-Media Separation unit into your preparation plant; to provide practical assistance in tuning up the installation.

30 Rockefeller Plaza, New York 20, N. Y.

WALWORTH PRESENTS

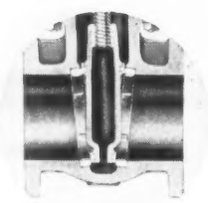
A New Line of

IRON BODY GATE VALVES

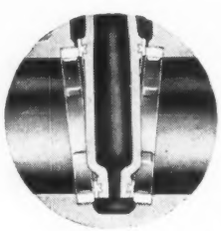
with screwed or flanged ends



... 8 Outstanding Features



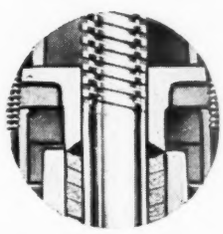
Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



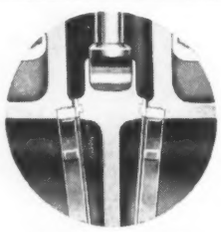
Seat Rings of end-seated type are screwed into the body.



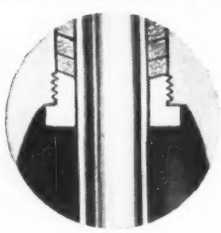
Sure-Grip Malleable handwheel for non-skid gripping even with heavy gloves.



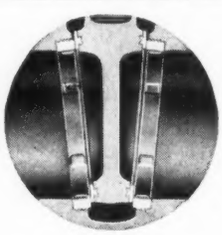
Brass Liner on Glands assures greater resistance to corrosion and scoring.



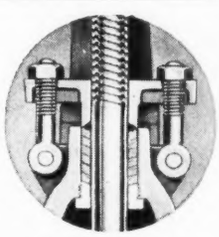
T-head disc-to-stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.



Bronze back-seat bushings in bonnets of OS&Y valves.



Solid Web Type disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For Complete Information on these new Walworth Iron Body Valves, write for bulletin 106.



HOW WE TOOK THE SOCK OUT OF SHOCK!

Another top performance by a BWH product

These huge, prefabricated slabs are the new "face" of a large western dam. Before they're applied, the surfaces must be cleaned with sand. And the entire face of the dam must be chipped and sand blasted in preparation for the new facing slabs. Doing these jobs with old-style sand blast hose often gave the operator an electric shock, sometimes very severe.

The reason is simple: Modern cutting agents and their increased velocities build up static electricity by friction. It accumulates along the interior of the hose tube . . . finally explodes like a miniature bolt of lightning . . . sometimes destroying the usefulness of the hose. But, much worse, it can give the operator a bad jolt.

BWH engineers went to work on this problem. They developed Bull Dog Sand Blast hose, featuring a specially compounded rubber tube stock that carries off most of the static electricity through the tube itself. What's left isn't enough to damage the hose. And the danger of shock to the operator is greatly minimized.

The "shock-absorber" tube of this Bull Dog Sand Blast Hose is wrapped with strong rubberized duck and enclosed in an abrasion-resisting cover. The hose works so well that it has been approved by countless safety engineers. It was used exclusively on this dam refacing job . . . with excellent results.

Bull Dog Sand Blast Hose is just one of the many quality products manufactured by BWH. Whatever your need for industrial rubber goods, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

★ ★ ★

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearby BWH distributor or write direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

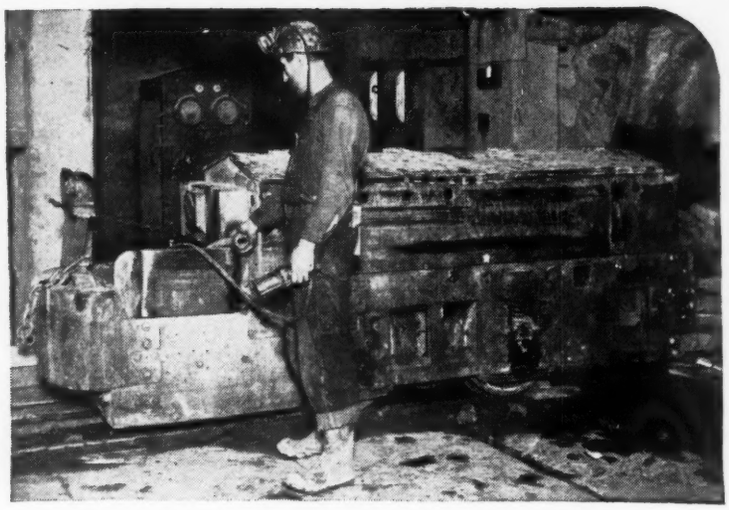
How to cut Haulage Cost

. . . per Year

. . . per Mile

. . . per Ton

!

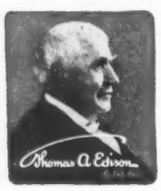


Use of EDISON Nickel-Iron-Alkaline Batteries in battery-operated locomotives and shuttle cars will help cut your haulage costs in several ways.

Perhaps most important, their unequaled dependability gives the closest approach to failure-free uninterrupted haulage it is possible to obtain. This is due partly to their steel cell construction which withstands rough usage, partly to their alkaline electrolyte which is a preservative of steel, and partly to their electrochemical principle of operation which is free from self-destructive reactions.

They do not require critical adjustment of charge rates, hence can be charged direct from the d-c power supply through relatively inexpensive resistors without need of motor-generators. They can be fully recharged in 6 to 7 hours and require no equalizing which helps get all charging done during off-peak periods.

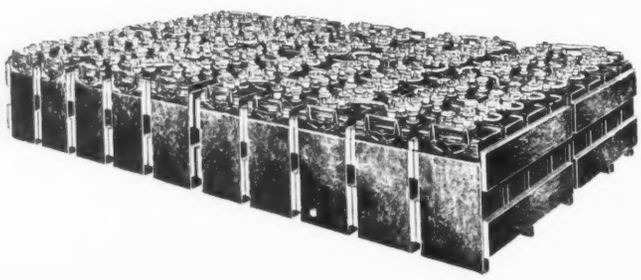
Finally, they give much longer service life than other types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.* In Canada: *International Equipment Company, Limited, Montreal and Toronto.*



EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



In Mine Locomotive and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

★ They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

★ They are **foolproof electrically;** are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.

★ They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.

★ They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

★ They can **stand idle indefinitely** without injury, without attention, and without expense.

★ They are **simple and easy to maintain.**

GET Better Lump

and more of it

with the SULLIVAN 10 RU Trackless Cutter



TRAMS FAST

EASILY MANEUVERED

LARGE CUTTING CAPACITY

LOW MAINTENANCE



Consult a Joy Engineer

SHEARS . . . CUTS TOP and BOTTOM *with equal ease*

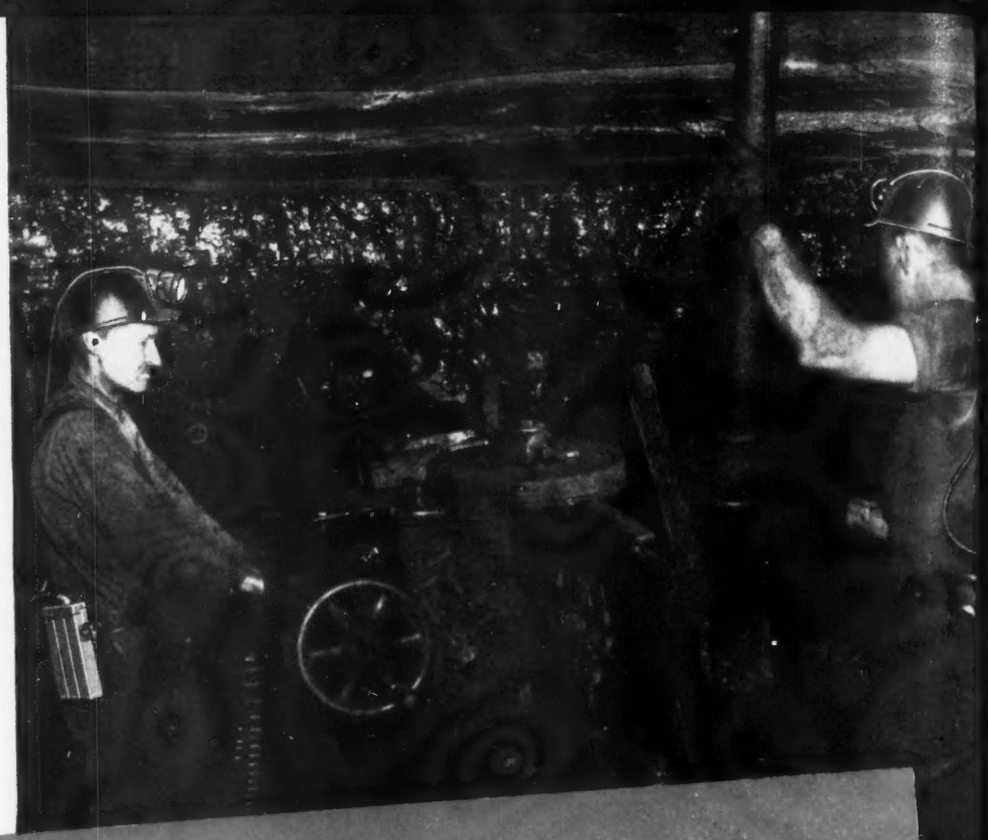
Hydraulic steering, short wheel base and large tires enable this versatile machine to maneuver in less total area and turn sharpest corners in any phase of trackless operation. Trams at 230′ per minute. Horizontal cuts made from 5″ below floor level to 7½′ above bottom. Front wheel drive gives excellent traction on soft ground.

WAD CL 1079

SULLIVAN DIVISION

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH, PA.



Efficient operations underground demand well-lighted working zones and personal protection for the miner against head injuries. These requirements are provided effectively and with complete dependability by Edison Electric Cap Lamps and M.S.A. Comfo Caps—serving better production throughout the mining industry. *Write for a practical demonstration!*

Where Protection builds Production



EDISON ELECTRIC CAP LAMPS

M·S·A COMFO CAPS

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH 8, PA.

District Representatives in Principal Cities

In Canada

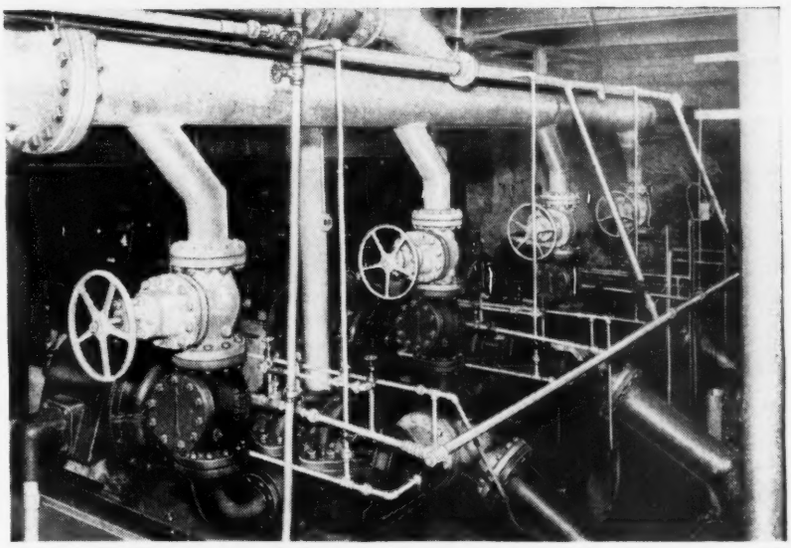
MINE SAFETY APPLIANCES COMPANY OF CANADA LIMITED

Toronto . . . Montreal . . . Calgary . . . Winnipeg . . . Vancouver . . . New Glasgow, N. S.

SOUTH AMERICAN HEADQUARTERS
Casilla 733, Lima Agents in Principal Cities

MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD.
Johannesburg, South Africa N'Dola—Northern Rhodesia

PUMP ROOM IN LEAD MINE *featuring Crane 250-Pound Ferrosteel wedge gate and swing check valves in outlet lines. Piping for entire installation can be specified from the Crane line.*



ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

It's Crane
for Everything... for Mine Pipe Lines

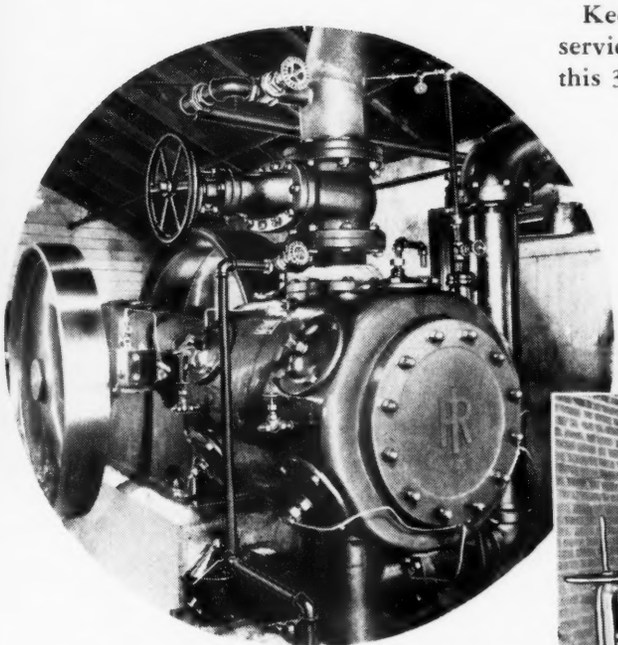
You're way ahead on any piping job when you pick up your Crane Catalog. Everything's there for the complete installation. Good selection and good, dependable quality in every last item.

Keep the Crane line in mind for quick, modern, and complete service on replacements as well as new pipe lines. Give yourself this 3-way advantage by standardizing on Crane materials:

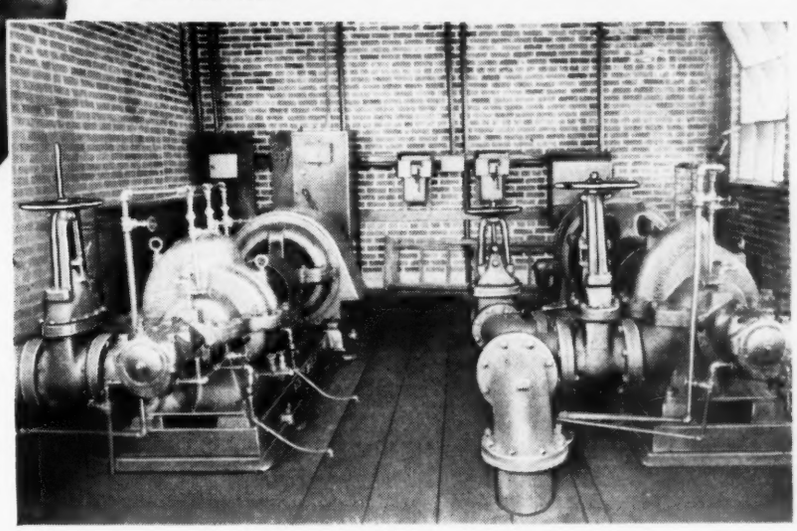
WORLD'S GREATEST SELECTION in brass, iron, and steel equipment for oil production piping. One order to your nearby Crane Branch or Wholesaler gets everything you need—valves, fittings, pipe, accessories, and fabricated piping.

UNDIVIDED RESPONSIBILITY for piping equipment. Helps you to get the best installation, and to avoid needless delays on the job.

OUTSTANDING QUALITY in every item. Assures uniform durability and dependability throughout piping systems —at lowest cost.



AIR SUPPLY TO MILL *from 17 x 13, 1000 cu. ft., low pressure compressor driven by 100 h.p. motor. Crane piping materials are in service on this entire system.*



BOOSTER WATER PUMPING STATION *in a large mine. Piping equipment . . . valves, fittings, pipe . . . all supplied by Crane.*

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Mining Areas*

EVERYTHING FROM . . .

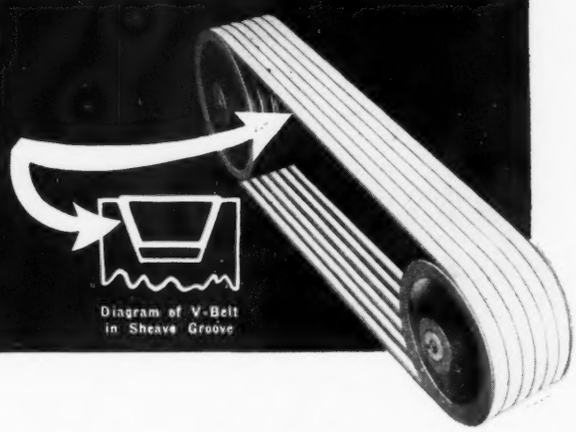
VALVES
FITTINGS
PIPE

CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM

ONLY the SIDE of a V-BELT *Grips the Pulley!*



—That's why the SIDE is what really *Gets the WEAR!*

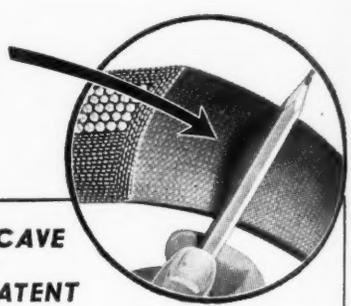
Look at a V-Belt in its sheave and you see at once that the *sides* of the belt do all the gripping on the pulley and get all the wear against the sheave-groove wall.

Notice, too—it's the *sides* that pick up all the power delivered by the driver pulley. The sides *transmit* that power to the *belt as a whole.*

And then, once more, its the sides—and the sides *alone*—that grip the driven pulley and *deliver* the power to it.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.

—*and here is how the* CONCAVE SIDE ★REDUCES Sidewall WEAR Giving You Much Longer Belt Life!



Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt. The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

★*More Important NOW That STRONGER Tension Members are Used!*

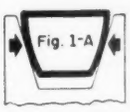
Now that Gates *Specialized* Research has resulted in V-Belts having much stronger tension members—tension members of Rayon Cords and Flexible Steel Cables, among others—the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall the life-prolonging Concave Side is more important today that ever before!

The CONCAVE SIDE is a GATES PATENT



Straight Sided V-Belt

How Straight Sided V-Belt Bulges When Bending Around Its Pulley



You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.



Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.



No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt.

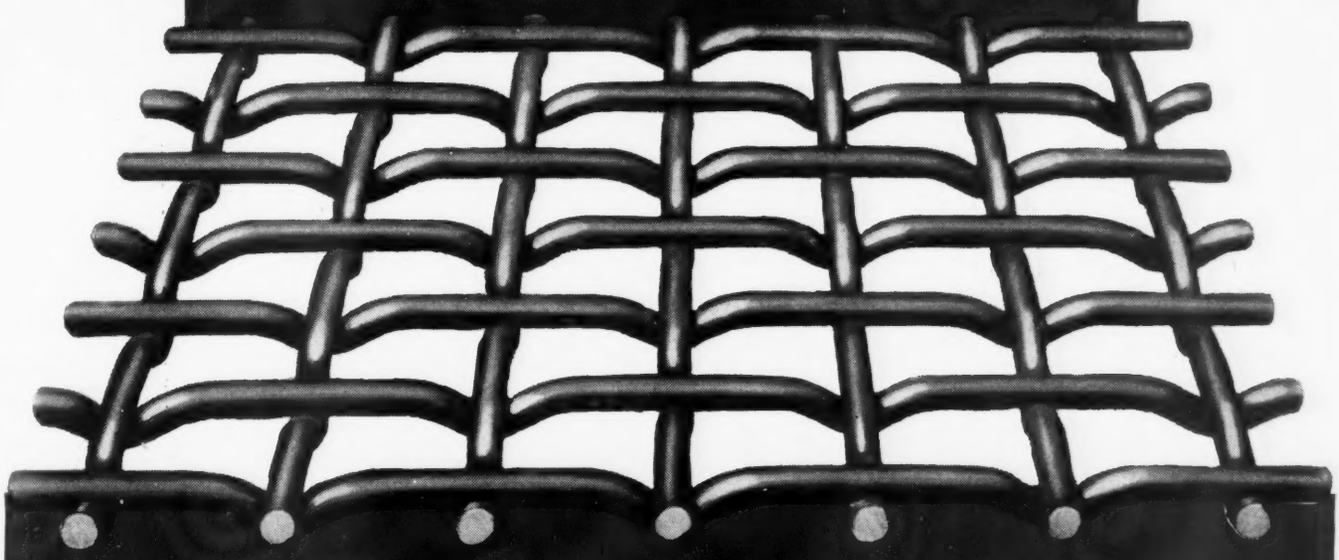
476

THE GATES RUBBER COMPANY, DENVER, U. S. A.
"World's Largest Maker of V-Belts"

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Gates
REG. U. S. PAT. OFF.
THE MARK OF SPECIALIZED RESEARCH

up to 90% MORE WEAR



with ROE-FLAT the New, High-Tonnage Wire Screen

Yes, incredible as it seems, you get up to 90% longer wire screen life with Roebling's new Roe-Flat—and at no sacrifice in volume of screening production. The secret lies in Roe-Flat's unique crimp, with its absolutely flat wearing surface. It brings to your screening job the combined advantages of both maximum open area and heavier wire diameters.

GET MORE WITH ROE-FLAT

More metallic wearing surface...75% more than ordinary crimps! Roe-Flat has no raised intersections to wear out first.. wear is distributed uniformly over nearly all the wire surface.

More screening production... because Roe-Flat's parallel wires on the same plane mean less blinding.

More accurate screening... and less re-screening needed, because of the accurate-sized openings in Roe-Flat.

More resistance to abrasion, wear and fatigue... the result of using improved quality steel in Roe-Flat.

A Roebling Field Engineer will gladly show you the savings possible with Roe-Flat... both on your average screen costs and on your over-all processing operation. Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY
Woven Wire Fabrics Division
TRENTON 2, NEW JERSEY

ROEBLING

A CENTURY OF CONFIDENCE

Manufacturers of Wire Rope and Strand • Fittings • Slings • Suspension Bridges and Cables • Aircord, Aircord Terminals and Air Controls • Aerial Wire Rope Systems • Electrical Wire and Cable • Ski Lifts • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Screen, Hardware and Industrial Wire Cloth • Lawn Mowers

MARION 4161

DIGS OUT ANTHRACITE "JACKPO



When Pittston Excavating Company discovered its anthracite "jack pot" at Tamaqua, Pennsylvania, in the form of a band of coal 300 feet wide and 100 feet deep, it was confronted with the problem of removing a 180-foot wall of rock.

A MARION 4161, equipped with a 5 cu. yd. dipper, was chosen to tackle the job of removing this rock, after it had been blasted, because of its reputation for power and capacity to handle such tough digging.

The MARION 4161 has proven to be an outstanding machine for this job with all of its advantages of balanced design, unusual degree of stability, low bearing pressure, low center of gravity with high ground clearance, speed, ample power, and ease of control playing a vital part in the success of the operation.

For more data about the MARION 4161, write for Bulletin 394. For more information about other machines in the extensive MARION Line of shovels and draglines, tell us your material handling problem and we will try to solve it for you.

From 3/4 cu. yd. to 40 cu. yds.

MARION

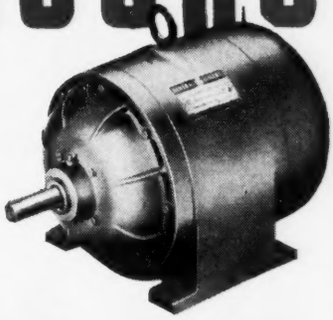
POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

Offices and Warehouses in all Principal Cities

5 BILLION MOTOR HOURS

PROVE YOU CAN'T BEAT



TRI CLAD

EXTRA PROTECTION

Announcement of the Tri-Clad motor, back in 1940, ushered in a new concept of general-purpose motor design. Substantially increased horsepower-per-frame-size was one feature. Smarter appearance was another. But what really sold more than a million Tri-Clad motors is the *extra protection* we built into them. Figured conservatively, they have delivered more than 5 billion hours of service.

Today, with the "family" including dripproof motors, vertical motors, gear-motors, capacitor-motors, and totally enclosed motors, the Tri-Clad motor is, more than ever, the motor that means basic protection, dependable performance, and minimum upkeep. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

EXTRA PROTECTION . . . AGAINST PHYSICAL DAMAGE!

Rigid cast-iron frame and end shields protect vital parts from external abuse and prevent resonance. Because they're not at the mercy of a coat of paint, they strongly resist chemical attack and dampness. Cast iron also gives you tight, *metal-to-metal* fits between end shields and frame.

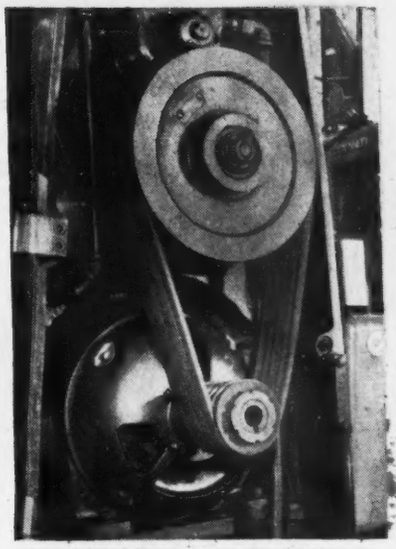
EXTRA PROTECTION . . . AGAINST ELECTRICAL BREAKDOWN!

Windings of Formex* wire, together with improved insulating materials, reduce the chances of electrical failure. Heat is dissipated quickly —motor stays young for years and years.

EXTRA PROTECTION . . . AGAINST OPERATING WEAR AND TEAR!

Bearing design affords longer life, greater capacity, improved lubrication features. Bearing seals retain lubricant, keep out dirt. One-piece, cast-aluminum rotor is practically indestructible.

Trade-mark reg. U.S. Pat. Off.



5 YEARS IN "SOLITARY"

Many machine tools in the Bell Aircraft plant at Buffalo have pioneer Tri-Clad motors tucked away inside. The result is a sleek exterior for the machine and valuable floor space saved. During the war, when time was short and uninterrupted protection was of utmost importance, these motors gave dependable service, demanding only a minimum of maintenance and inspection. The Tri-Clad motor you see here driving a milling machine has not been removed for five years. It has done its job faithfully despite the strain of a 3-shift, 7-day work schedule, and along with 200 other Tri-Clad motors in the Bell plant, gives every sign of staying on the job indefinitely.

NOW—PEAK MOTOR TOUGHNESS

The Tri-Clad totally enclosed, fan-cooled motor is designed for use in adverse atmospheres — in iron dust, out-of-doors, in hazardous areas, and chemical atmospheres. It gives you these important construction features:

- A cast-iron, double-wall frame which completely encloses and protects windings and punchings.
- A nonshrinking compound around motor leads which protects motor interior from dust and moisture.
- A rotating labyrinth seal which further protects the motor interior from damage by foreign matter.

TRI CLAD
REG. U.S. PAT. OFF.
MOTORS

GENERAL ELECTRIC

750-286C

FORWARD 15 m.p.h. four speeds



TOURNADOZER.

PRODUCTION TABLE — PUSHER LOADING			
Haul One-way	Tournapulls served	Haul One-way	Tournapulls served
300′	2	5,000′	7
1,000′	3	6,000′	8
2,000′	4	7,000′	9
3,000′	5	8,000′	10
4,000′	6	10,000′	13

PRODUCTION TABLE — DIRTMOVING		
Haul	Yards in 1 Hour	Yards in 8 Hours
50′	184	1472
100′	118	944
200′	66	528
300′	46	368
400′	35	280

Above production based on good working conditions, negligible grades, level cuts, efficient management and 60-minute-per-hour operating efficiency.

LETOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

REVERSE 15 m.p.h. four speeds

Dozer travel is 50% forward, 50% reverse, so the revolutionary new four-wheel-drive Tournadozer gives you approximately double the fastest crawler's forward speed and full range of *FORWARD SPEEDS IN REVERSE.*

Dozer work involves lots of shifting, so the high-speed Tournadozer has constant-mesh Tournamatic transmission . . . gives you instantaneous change of gear ratios forward or reverse, any time . . . any place. Just move lever to any gear selection you want and you're in it and *ON YOUR WAY . . . . RIGHT NOW.*

Dozer duty is hard on tracks, so the new Tournadozer rolls on rubber . . . big tough tires 21.00 x 25. That cuts out a lot of track repair delays and materially *CUTS MAINTENANCE EXPENSE.*

Dozer jobs often get into soft going, so the big Tournadozer tires have tapered beads. That means low tire pressure . . . extra flotation . . . and lets you use extra low pressure to get *PLENTY OF TRACTION IN SAND AND MUCK.*

Dozer work has always been tough on the operator . . . Tournadozer operators ride easy on low pressure pneumatic tires . . . sit easy on hydraulic suspension seat . . . take it easy because air-actuated finger-tip controls *TAKE LABOR OUT OF OPERATING.*

Dozer travel often involved slow on-job moves and expensive haul from job to job. But the new Tournadozer goes anywhere on the job or *DRIVES JOB-TO-JOB FAST . . . . AT 15 MPH.*

Check your LeTourneau Distributor for delivery. **Order NOW.**

4 wheel drive on rubber



Just move the selector lever to the speed you want and the air clutches give it to you *instantly.*



4-wheel drive plus big, low-pressure tires give plenty of traction and flotation to move big loads of abrasive, loose sand.

LETOURNEAU HIGH-SPEED RUBBER-TIRED **TOURNADOZERS**

PEORIA, ILLINOIS

Tournadozer, Tournamatic — Trade Mark Reg. U.S. Pat. Off. Ext.

FIRST MACHINE DESIGNED FOR DOZING AND PUSHING

4 IMPORTANT REASONS WHY YOU NEED THE WHALEY "AUTOMAT"

LIMITED HEAD ROOM . . .

With its Parallel Lift Rear Conveyor, always parallel to top of car, the "Automat" loads cars having the greatest possible height and capacity, and loads them heavier.

SAFE LOADING . . .

The exclusive Vertical Lift Shovel Action means safe loading always because all power is directed in a vertical plane . . . the "Automat" can't side kick . . . can't knock out timbers, cause falls or crush men.

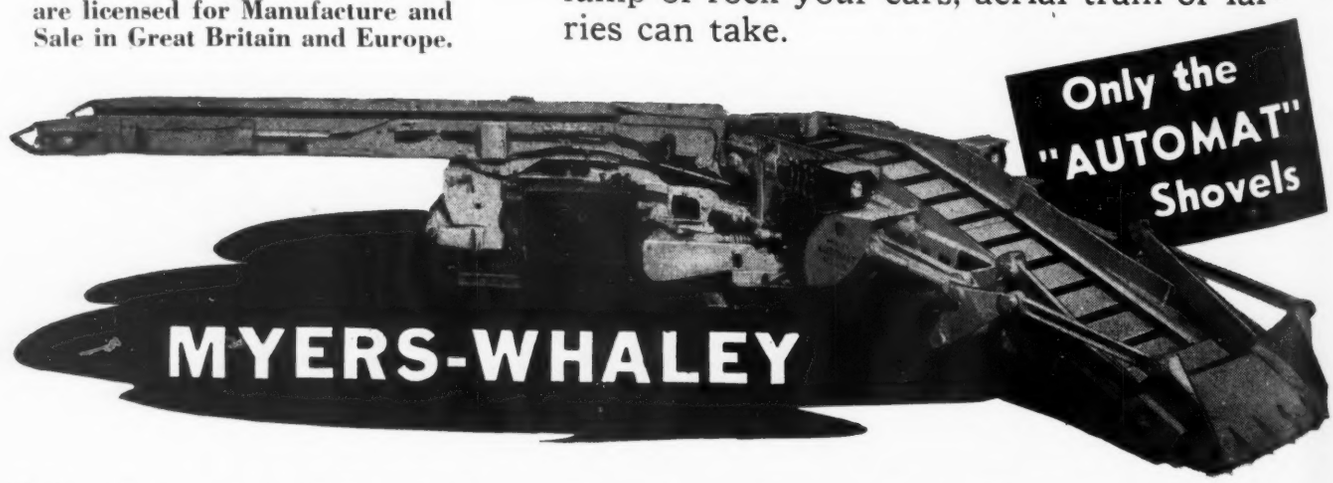
ROCK BOTTOM POWER COSTS . . .

1/5 K.W.H. per ton of material loaded is all the "Automat" needs. That's because it is powered by a *single* 25 H.P. Motor . . . the lowest power requirement of any loader of equal capacity.

MAXIMUM EFFICIENCY . . .

Whether you are loading coal, rock or slate . . . you always get maximum efficiency with the "Automat". Rated capacity is 7 tons a minute . . . average loading rate is 3 tons a minute. And remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple . . . any lump of rock your cars, aerial tram or larries can take.

Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for Manufacture and Sale in Great Britain and Europe.



Mechanical Loaders Exclusively for Over 39 Years



. . . Slash Downtime Hours with— FIRESTONE Tires and Project Service

EVERY contractor knows how quickly minutes add up in dollars of lost profit whenever any equipment "goes down" on the job. To avoid downtime due to tire failure, many contractors are using the new Firestone combination—off-the-highway tires and on-the-project service.

Firestone Project Service is a basic and simple program which pays off in greatly increased production and extra hours of tire life.

Firestone tire service engineers will analyze your operation, recommend the tires specifically built for that type of work. They will install an inspection and maintenance schedule which will cut your tire costs to the bone. And if you wish, these engineers will assume full responsibility for the successful operation of every tire on your project.

For further details, and without obligation, write Project Service Engineering, The Firestone Tire & Rubber Company, Akron, Ohio.

Listen to the Voice of Firestone every Monday evening over NBC

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Firestone

OFF - THE - HIGHWAY TIRES


It's

It's amazing what people will swallow



THERE has been much ballyhoo about water power.

Many people have been led to believe that a water power plant can produce electricity cheaply because it burns no coal.

Nobody seems to make the public understand, that to have a large water power plant you first have to buy hundreds or thousands of acres of land, which will be flooded by the water behind your dam. Then you build your dam. Then your power plant.

Facts They "Soft-Pedal"

Nobody seems to point out that because water power is where Nature puts it, you may have to build a long, expensive transmission line, which may be needed to carry the power to market—and that a lot of the electricity generated will be *lost* in the line. Truth is, it costs more to transmit electricity 50 miles than it does to ship equivalent coal 500 miles!

Nobody seems to get to the public the truth, that when all this is added up, the figures are very likely to show that it would have been cheaper simply to build a steam station where you want it, and *burn coal.*

They're Quiet About This, Too

Finally, nobody seems to mention that a dry season may shut down the water power and force a steam plant to be built after all. As a matter of fact, every one of the major hydro-electric systems is backed by steam "standby" stations.

Moral: Build the steam station in the first place, and burn coal.

In justice to the public's interest as well as its own, the coal industry might well spread these facts. The Chesapeake & Ohio Railway is glad to help. Simple and unassailable as these truths are, probably not one person in fifty among the general public knows them, or has any idea whatever of this aspect of the situation.

Chesapeake & Ohio Railway

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It has exactly the right one of 5 Dodge "*Job-Rated*" clutches, 4 transmissions, 18 rear axles . . . the right units throughout . . . for "top" performance with the loads it carries, over the roads it travels. It is completely "*Job-Rated*" to fit its job . . . to last longer, and for dependable, money-saving operation.

YOU, too, can buy a truck that will fit *your* job . . . giving you better performance at lower cost.

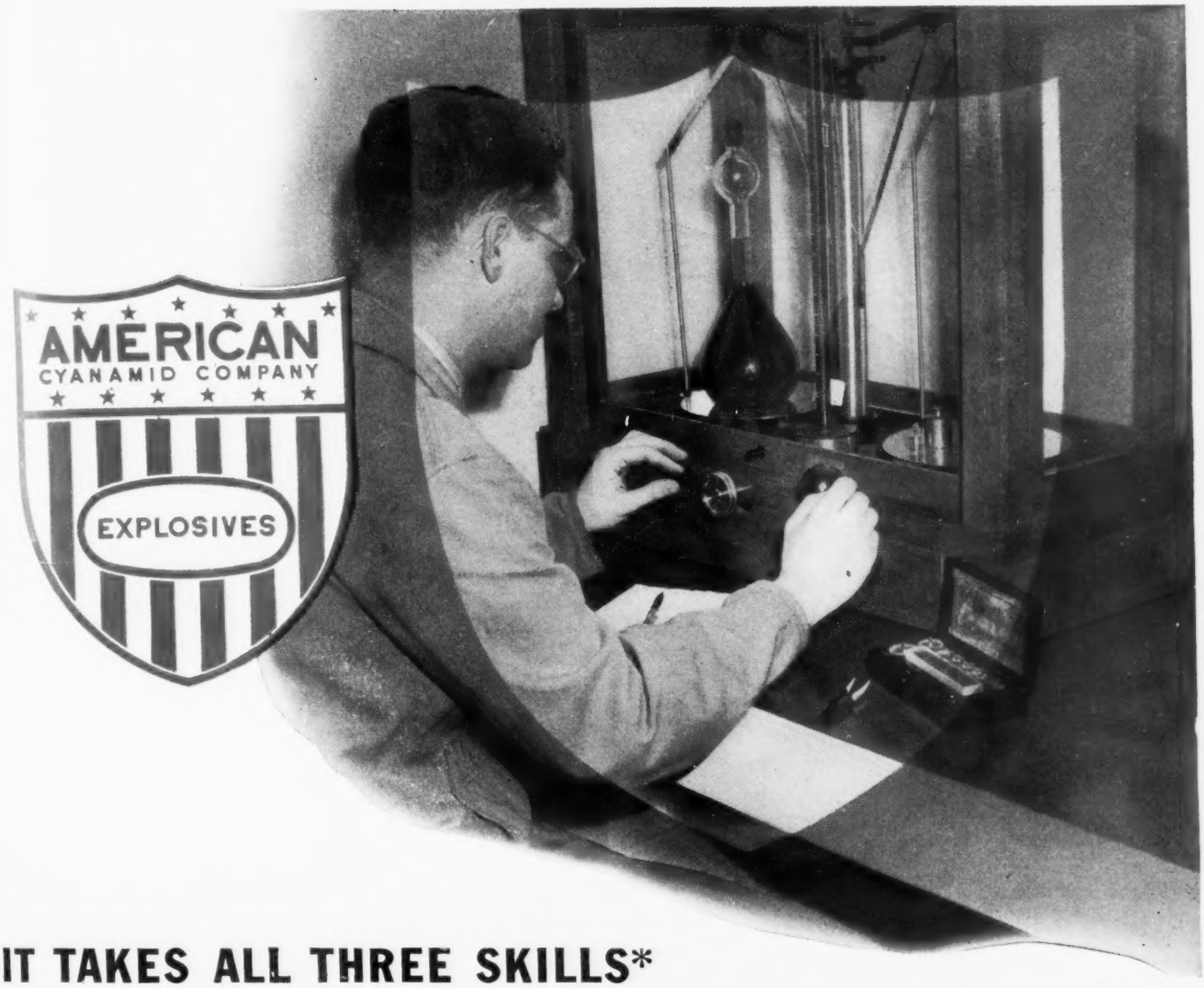
To get such a truck, see your Dodge dealer. He will analyze your needs. He will recommend the right truck. He will serve you well . . . including dependable truck service whenever you need it. . . . See or call him today.



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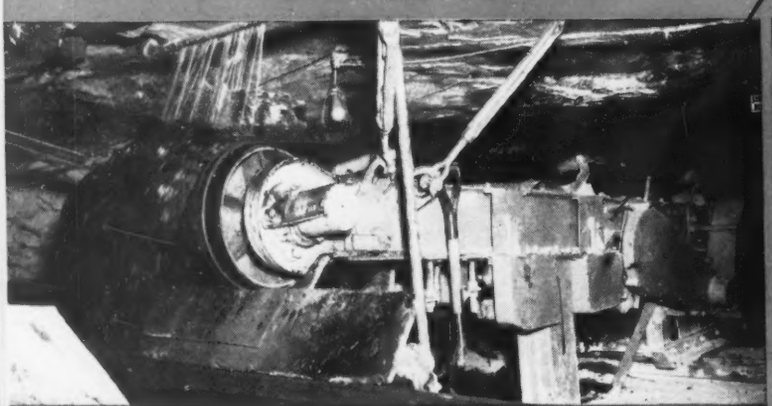
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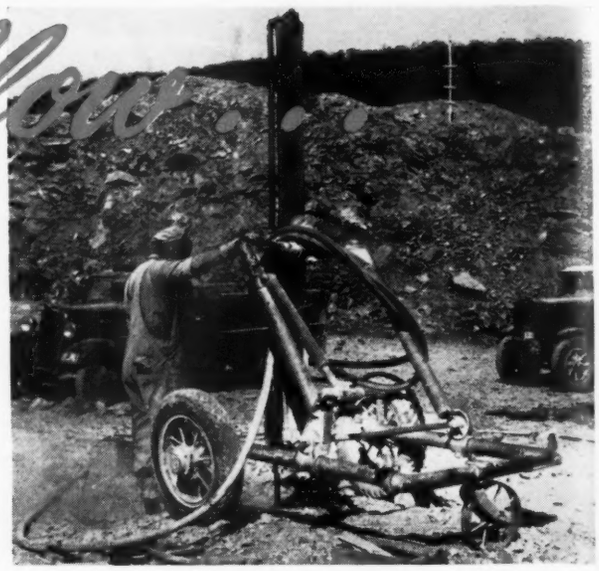
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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JUNE, 1947

Ivan A. Given, EDITOR

Time for Peace

"WHAT the great bulk of this industry wants and needs today is peace. Not just month-to-month peace, nor even year-to-year peace, but continuing peace so that those dependant on coal may see increasing stability in the industry. And by 'stability' I mean reliability of production, quality and price."

In this statement, part of an address before The Executives' Club of Chicago, George H. Love, president, Pittsburgh Consolidation Coal Co., wrapped up in a nut shell the No. 1 problem of the coal-mining industry. Why does this problem exist? Why hasn't there been peace? As Mr. Love also pointed out, part of the answer lies in government policy and actions and part in the exercise of monopolistic powers by union leadership, highlighted by refusal to bargain except on terms laid down by that leadership.

Now, bituminous operators are again engaged in an attempt to reach a settlement with union leadership that will contribute to peaceful progress. This time, government partisanship is not quite so evident—at least yet. The attitude of union leadership, as in the past, is an unknown quantity. However, there are at least two parties involved that earnestly desire peace and an opportunity to settle down and cash in on the opportunities that lie ahead. These are the operators and the miners. The *Coal Age* opinion poll of last December and the reaction of the miners to the April safety strike are cogent evidence that they would appreciate greater stability and a chance to take advantage of the working opportunity now available.

A settlement that will assure peace not only now but permanently is highly necessary for several reasons. The big one is coal's competitive position. Wage increases constantly outrunning increases in tons per man, and the production interruptions that have accompanied recent forays by union leadership, have not enhanced coal's position in the minds of the consumer and the public. Now, things are beginning to favor coal a little more, and peace in the industry will enable both operator and miner to serve the public better, thus giving the nation a needed lift while benefiting the industry and its employees.

Peace will enable the miner to cash in to the utmost on high wage rates and maximum opportunity to work. Peace will enable the operator to get efficiency up and costs down, thus strengthening coal's market position. Peace will permit serving the user better and winning the public favor so vitally necessary for industry progress. Everyone, in fact, stands to gain through a settlement fair to all parties and which will lay the foundation for permanent peace and cooperation. That is something that should be marked well, not by the operators alone but by government officials and union leaders in the days to come.

Turning Tide?

ALL PRESENT signs point to the fact that users of oil and natural gas will have some problems in getting enough for their needs this coming winter. Cold spells last winter threw peaks on natural gas that it was unable to take care of. This winter, according to some prognosticators, oil will join gas in that category. The situation reflects not only the increased use of all fuels but gains made by competition in markets coal normally would have served. It is an opportunity for coal even though it presents some problems.

If coal is to take full advantage of this turn in the tide from the supply standpoint, it must do its best to bring to pass a number of things, although some are not completely within its control, such as strikes, forced wage increases and so on. But it should make every reasonable effort to avert production stoppages that would result in a short supply. It should help get equipment sold and installed. It should supply a high-quality product—as far as possible in the desired sizes. It should bend every effort toward improving its service to the user. Thus, it can take full advantage of the growing opportunity now being presented to it.



Wide World Photos

"WELFARE": Problem and Opportunity

Where does the coal-mining industry stand in "welfare"? What can it do and how will it benefit? In the following material, *Coal Age* offers an analysis of the problem and of suggestions for an industry program designed to benefit the miner, the company and the public.

"PATERNALISM," once a nasty word when applied to coal operators and other employers by labor leaders, "liberals" and "progressives" dedicated to putting a spoke in the employer's wheel, seems to be becoming respectable again—at least in certain quarters. It is not called that now—"welfare" is the new term—but it is what labor leaders are trying to practice on an increasing scale—with the help of their supporters within and without administration circles, *and*, with funds wrung out of the employer by strikes and threats of strikes.

"Paternalism" is defined by Webster as follows: "A relation between the governed and the government, the employed and the employer, etc., involving care and control suggestive of those followed by a father; also, the principles or practices so involved."

There is, of course, nothing wrong with "care and control" properly exercised by a good father, although the good father is not likely to make it possible by forcing the other fellow to provide the means. Because, as in a proper father-and-son relationship, paternalism tends to create a strong bond and promote mutual cooperation between the son and the father, or the employer and the employee, or the foreman and his men, labor leaders and their supporters have derided and fought it because it gets in their way.

Now, hoping to sidetrack the employer and create a similar bond, or make certain that a less-enduring relationship becomes one, they are offering gobs of paternalism and are trying to finance their efforts by levies on the employer and the public. To complete the job, labor leaders also are trying to eliminate even the influence of the foreman, either by reducing him to a nonentity or by the more direct method of attaining authority over him by unionization. A major weakness in their position is the fact that the union members they are practicing on cannot help but learn eventually, with a little assistance if necessary, that they are not the real source of the alleged benefits offered. Never-





Left—Building a bond between the miner and his company by making things for a better living available to him and his family—part of Camp Thomas E. Lightfoot, Eastern Gas & Fuel Associates, Hinton, W. Va. Good mining communities help the miner and make him a better worker. Right—part of the housing in an old but pleasant and comfortable company-owned mining community. Below—demountable housing units for employees being erected at the government oil-shale demonstration plant near Rifle, Colo.

U. S. Department of the Interior

theless, union leaders are trying hard and, as a gift from the New Deal, pending further legislation, they have the power to make things tough if they don't get their way.

The hazard in paternalism grows out of the "control" aspect. An overly-paternalistic father can prevent his son from ever standing on his own feet by bearing down on the control. Thus, the son becomes a vassal, always dependent upon and ever at the mercy of the father. In view of this hazard, a critical examination of the effects of "welfare" and other "nursing" projects on the standing of the employee as an individual certainly is in order.

"Welfare" May Limit Freedom

First off, taking away from the employee all responsibility for his own fortunes, whether it is done by government, union leader or employer, necessarily means that he ceases to be an individual and becomes instead a subject, completely at the mercy of the master, whoever he may be. There is no substitute for individual responsibility if freedom is to be preserved. And there is good ground for suspecting that "welfare," as practiced by union leaders, aided and abetted by certain types of office seekers, government officials and their kindred spirits—still much too common—can lead to nothing else but limitation of the individual's freedom.

True paternalism in relations between governed and government and between employee and employer, no matter how much it is sugar-coated, tends to lead to abuses because of the "control" aspect. But is that a sign that nothing can be done? Experience is to the contrary. Without practicing paternalism, the employer and his representatives, including the foreman, can help the worker help himself with profit to the company and to the public. This is true because the employer, the management and the worker are, in reality, partners in a joint venture and anything one party can do to help the other without limiting his freedom benefits the partnership.

What May Employers Do?

What is the responsibility of the employer and what is it practicable for him to do without encountering the dangers of paternalism? The suggestions are almost innumerable. Latest is "A Medical Survey of the Bituminous-Coal Industry," the so-called Boone report, issued in conformity with one of the provisions of the Krug-Lewis agreement.

Passing over, for the moment, the specific recommendations and their tendency to consider the miner and his family as something like rag dolls to be put here and there, dressed, entertained, and so on, while they remain inert subjects, the Boone report makes two significant declarations:

Poor Conditions Not General

"Any assertions which may have been made that inferior standards are general in the coal industry are disputed by the survey. Definitely low standards of health are readily apparent in certain places, but not in all areas where coal is mined. Provisions for health range from excellent, on a par with America's most progressive communities, to very poor, their tolerance a disgrace to a nation to which the world looks for pattern and guidance."

While those in the Department of the Interior in charge of preparing the newspaper release announcing the survey report tended to stress the concluding words and forget the rest, it now becomes official that conditions in the coal industry are not all bad. It also becomes apparent that the responsibility is a little broader than some in the past would have the public believe, per Statement No. 2:

"The survey has revealed convincing evidence that joint leadership is obligatory if industrial hygiene and industrial medicine are to be effectively applied, and if higher standards of living for the miner and his family are to be at-

WHAT THE BOONE REPORT RECOMMENDS

Action by the Operators

1. Early improvement and modernization of coal-company housing.

2. Elimination of inequitable provisions in housing leases.

3. Action to make housing, with provisions for essential utilities, available for sale at reasonable price and on liberal terms.

4. Immediate action to provide a safe water supply and good sewage, refuse-disposal and garbage-handling facilities, plus other sanitation improvements.

5. Expansion of the industry's research activities to include industrial medicine and hygiene.

6. Retention or employment of physicians to discharge management's responsibilities for protecting and promoting employee health and for developing an industrial medical and hygiene program apart from the general medical and hospitalization programs paid for by employees.

7. Encouragement and assistance to mine physicians in the promotion of health education and preventive medicine.

8. Expansion of the management industrial medicine and hygiene program to include physical examinations, prompt medical attention after injury, first-aid facilities, industrial nursing on the job, cooperation by the company doctor in accident and occupational-disease prevention and authorization for the company doctor to procure outside aid or consultation, and to cooperate in giving and to participate in first-aid training and the keeping of accident and absenteeism records.

By the Union

1. Assistance to miners in the purchase of homes.

2. Investigation of the practicability of setting up local housing corporations.

3. Guidance of miners in the purchase of homes.

4. Enlistment of the cooperation of public and private agencies in a study of the cost of complete medical care.

By Operators and Union

1. Review of existing agreements to adjust house rents to permit periodic maintenance and provide a reasonable return to the owner.

2. Encouragement and assistance in the incorporation of coal-mining communities.

3. Establishment of local committees to promote housing, community services, sanitation and health.

4. Support of proposals for better health measures by states.

5. Promotion of first-aid training and sharing of the cost.

6. Establishment of better facilities for the rehabilitation of handicapped, diseased and injured miners.

7. Establishment of better local hospital facilities.

8. Establishment of a "National Office of Recreation."

9. Establishment of "District Offices of Recreation."

10. Enlistment of the cooperation of outside agencies in promoting better recreation.

11. Sharing of the expense of national and local recreational work.

12. Study of the feasibility of changing present working schedules to give the miner a better break.

By the States

1. Establishment of minimum housing standards.

2. Requirement of building permits to secure adherence to standards.

3. Provision for local approval of housing plans where other regulations do not apply.

4. Establishment of facilities for checking water supply and requiring adequate facilities at each new mine.

5. Making washhouse installation compulsory.

6. Making funds available for enforcement of sanitation and health regulations.

7. Undertaking, in cooperation with federal authorities and coal companies, a continuous health-education program.

8. Making available increased facilities for checking tuberculosis.

9. Establishment, with federal and local authorities, of better facilities for securing and using health statistics.

10. Expansion of industrial-hygiene services.

11. Enactment of compulsory compensation laws where they do not exist.

12. Establishment of facilities for making effective the standards of the federal Hospital Survey and Construction Act.

13. Establishment of hospital standards conforming to those of medical and hospital associations and periodic check of hospital facilities.

14. Establishment, development and expansion of recreational divisions in departments of education.

General

1. Setting up of facilities for better child care by voluntary philanthropic organizations in collaboration with medical societies.

2. Extension of the activities of voluntary health agencies to rural and isolated coal-mining communities.

3. Broadening of the Bureau of Mines health and safety program to include industrial medicine and hygiene.

4. Submission of compensation claims to appropriate agencies by physicians to insure payment.

5. Development of the practice of industrial medicine by medical associations.

6. Appointment of a recognized civilian medical leader to any trusteeship for medical care and hospitalization.

7. Expansion of prepayment plans for medical care on a sound actuarial basis.

8. Experimental establishment of prepayment plans for dental care.

9. Expansion and improvement of hospitals in coal-mining areas.

tained. Leadership is not confined to management; there is need for its application by labor representatives. The present situation, which brought about the medical survey of the coal industry, would not have occurred had a sense of joint responsibility existed. Management has demonstrated in some instances a high degree of leadership in providing medical care. There is little evidence of corresponding labor leadership in health matters. Leadership in the ranks of labor is more evident in other union activities. Groups of both management and labor have still to learn that with authority comes responsibility."

The gist of the recommendations made in the Boone report appears elsewhere in this article. They could be analyzed in detail. However, aside from reminding labor leaders, public bodies and the medical profession that they, too, have responsibilities, the report is additional evidence that the public and government, rightly or wrongly, expect much from the employer.

The fact that progress has been made by the entire industry and that many companies have gone a long way in helping the miner and his family live better is evidence that there should be something in additional effort along sound lines —without affecting the self-respect and stature of the individual.

Coal Provides Good Income

The foundation of a better living for any man is a good income. This the coal industry provides. But unless facilities also are made available so that that income can be converted into better living, it can be—and often is—frittered away without benefiting the worker or his family. Whatever the employer, while leaving the worker the architect of his own fortunes, can do to help him get the most out of his income, should make him a better man, a better worker and a more valuable asset to his employer. In addition, it can cement the partnership that should exist between employer, management and employee and thus lead to greater cooperation toward the common goal of better service to the public—and to a lessening of the troubles resulting from attempts to drive a wedge between owners and workers.

Having discharged its basic responsibility by providing the principal foundation for a good living for the miner—a good income—the question for the coal industry then becomes: "What else should be done?" Can the coal operator accept a union "welfare" fund, pay into it and consider that he has completely discharged his responsibility? Should he do nothing?

The answers to these questions are not easy, no matter how glib any report may be in its recommendations. However, there is a middle ground—one that gives the employer an incentive and an opportunity no "welfare fund" derived from a forced levy can provide, and which also strengthens the partnership that should exist between the miner and his company.

Employee Welfare Profitable

Because good housing, good community facilities and pleasant surroundings, plus good medical, health and recreational facilities, attract better men and bind them closer to the company, the trend in the coal industry has been in these directions. They are things, experience has shown, it is good business for the company to provide, while at the same time making it possible, where it is logical for the miner to participate, for him to carry his share of the load and have a voice in what is done and how. This is in line with the principle that the miner and his family are individuals and like to be treated as such. In other words, it assumes that the miner wants to pay his share of the way and stand on his own feet to the best of his ability. Anything done by the employer, or by any other agency, should start from there, rather than from the all-too-frequent basis that the miner is somebody "to be done for."

"How and how much?" are, as stated, questions that are difficult to answer categorically. The life of mines, the proper apportionment of responsibility between employer, worker, the worker's representatives and various public and governmental agencies are not little problems. Neither is the cost to the worker, the consumer and the public. But as also pointed out, the employer, rightly or wrongly, is expected to take action.

Industry Program Planned

In view of the size and scope of the problem, an industry organization that can coordinate and give direction to effort and work for sensible solutions divorced from politics—union or otherwise—and from wage negotiations and agreements, is a logical step. The problem is little different from that involved in safety, in which the public —or at least some segments of it— asserts an interest, in addition to the real interest of the industry. To make coal's safety efforts more effective, the directors of the National Coal Association, on April 30, announced an industry safety organization, as follows:

"The board of directors of the National Coal Association recognizes the desirability of the continued exercise of its functions by the Bureau of Mines under existing law and has provided for the appointment of a committee to be known as the National Mine Safety Committee to report promptly a program for improvement where necessary, and by all practical means, of safety standards, regulations and practices adaptable to the various regions.

"The committee will take into account, among other things, the necessity of preserving management's responsibility for operating the mines, the desirability of supplementing state standards, laws and enforcement, of securing the cooperation of the miners and of preserving the effective work of the federal Bureau of Mines under present law. The committee is directed to develop standards applicable to the individual states and local conditions which can be recommended for adoption.

Standards to Be Developed

"The committee will consist of operators and technical people and will be authorized to name subcommittees to facilitate its work in the interest of prompt action."

Public and official pressure is not so great in the field of better working, living and health conditions as it is in safety. But the pressure is there and it is growing. As with safety, the coal-mining industry can serve itself and its employees better by organizing to do the things that should be done as soon as time, money and a regard for the interests of the miner permit.

Better living, working and health conditions for the miner and his family make for better, more willing and more efficient workmen. They head off outside attacks and promote public respect for the industry. They also strengthen the bond between the man, his family and the company, promoting the greatest good for the greatest number, including the public. Organization and a carefully-thought-out program from which to work are logical steps in the right direction.



When miners enter this service building they need not step outside again until the end of the shift, after they have bathed and donned their street clothes. Low building (left) is the motor house for the mine fan. The penthouse, also at the left, houses the traction unit and motor-generator of the passenger elevator.

ELEVATOR FOR MEN
Tops New Willow Grove Portal

Standard Passenger-Type Elevator Handles Men in New Portal Installation, Including Wash and Change Facilities, Offices, Lamp Room and Other Facilities—Underground Travel Cut Four Miles

★ ★ ★ ★ ★

MINERS GOING TO WORK in Willow Grove No. 10 mine of the Hanna Coal Co., near St. Clairsville, Ohio, need not step outside after they enter the new portal or service building, which includes the washhouse. From a waiting-room at one end, they enter the mine by riding down on a passenger elevator of standard office-building type. This portal, which was put into use at midnight Feb. 9, reduces underground travel four miles for most of the crews. A revolving door forms an air-lock between a corridor at the bottom of the shaft and the mine proper.

At this mine, an old operation but fully mechanized with track-mounted mobile loaders operated three shifts, 9,000 tons of material (full-seam mining, Pittsburgh bed) is hauled to the preparation plant at Willow Grove, near Neffs, 4½ miles from St. Clairsville. Daily shipments of clean coal average 5,700 tons per day. The Willow Grove portal is a drift opening where the seam outcrops. Until the recent improvement, the men assembled at Willow Grove and rode in on man-trips from that point.

The 175-ft. shaft, part of which is now used for the passenger elevator, was sunk in 1943. A stairway was installed in a 6x12-ft. compartment between two curtain walls and, for a time, this shaft served as a ventilation upcast and escapeway. In 1946, a Jeffrey Aerodyne fan was installed and the stairway removed to make way for the elevator. This shaft, shown at the lefthand side of the mine map, is within a

few hundred feet of paved State Route No. 9 and only 1½ miles from St. Clairsville. The new portal substantially reduces the average automobile travel to and from the men's homes.

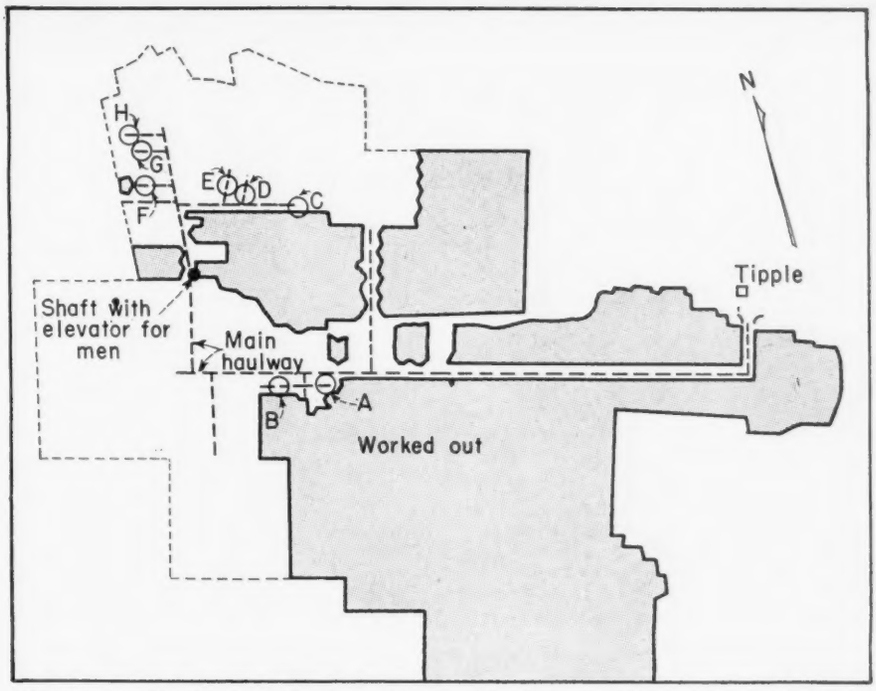
Eight panels are being worked in the mine and these are indicated by the large circles and letters on the map. Panels *"A"* and *"B"* will be finished in the next few months and then all work will be concentrated in that portion of the mine inby the new shaft. The shaft bottom is within 200 ft. of the main haulageway. Therefore, after stepping off the elevator, the men have but a short walk through a corridor to the side track from which the mantrip starts.

Elevator Holds 18 Men

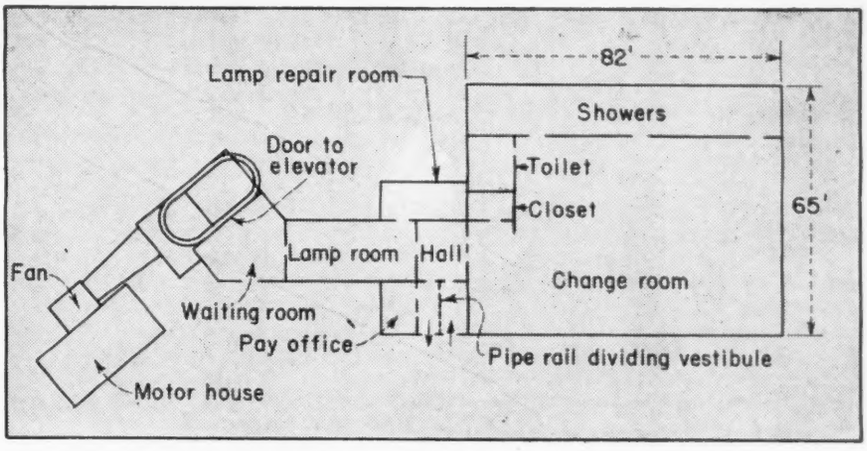
Floor dimensions of the elevator car are 5x11 ft., the capacity is 3,500 lb. and the usual loading per trip is 18 men. The total lift is 181 ft., the maximum speed 500 f.p.m. and a one-way trip takes 22 seconds. About 12 min. is required to lower the 185 men who go in on the 7:00 a.m. shift, which is the largest of the three.

The elevator, made and installed by the Otis Elevator Co., is a gearless-traction unit driven by a direct-connected 190-volt d.c. motor operating at 127 r.p.m. The motor-generator supplying the variable-voltage direct current stops when the elevator is idle, except that a timing relay is adjusted to keep the motor-generator in operation 37 seconds after the elevator completes a one-way run. As a rule, this motor-generator runs continuously during the period of lowering or hoisting a shift of men.

The elevator is operated by push-

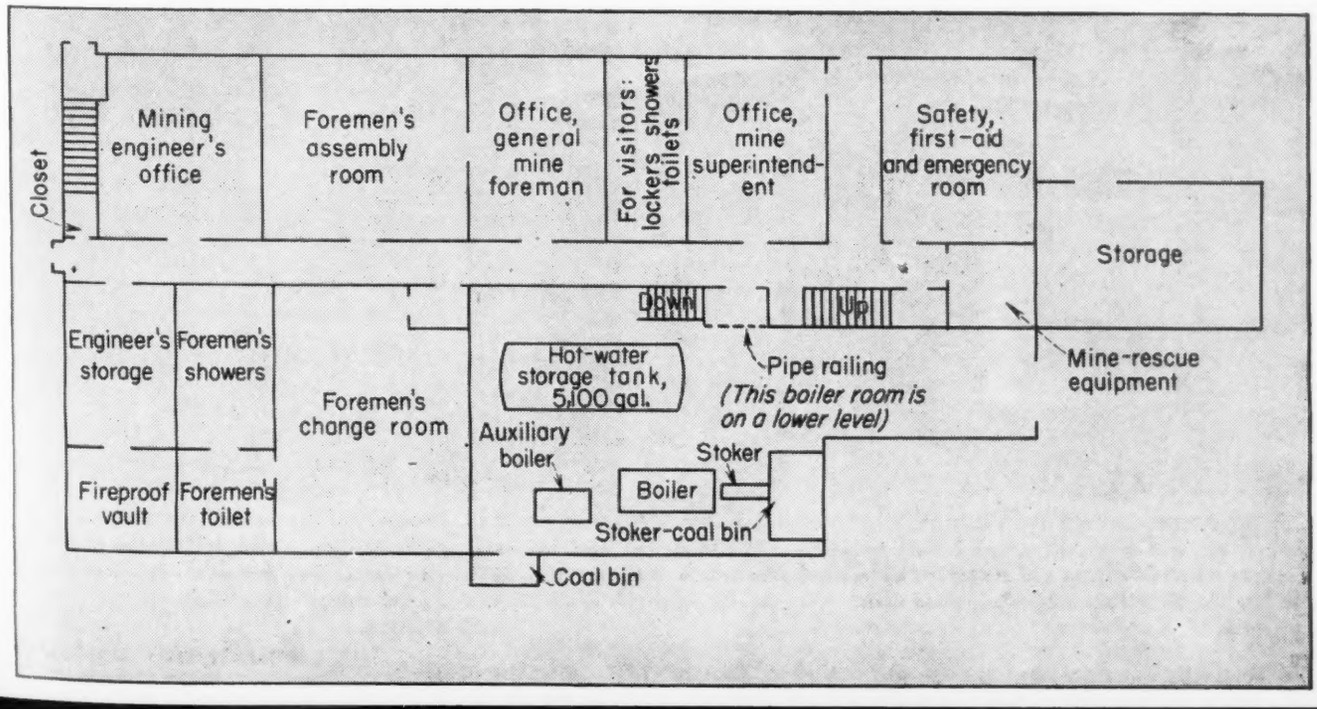


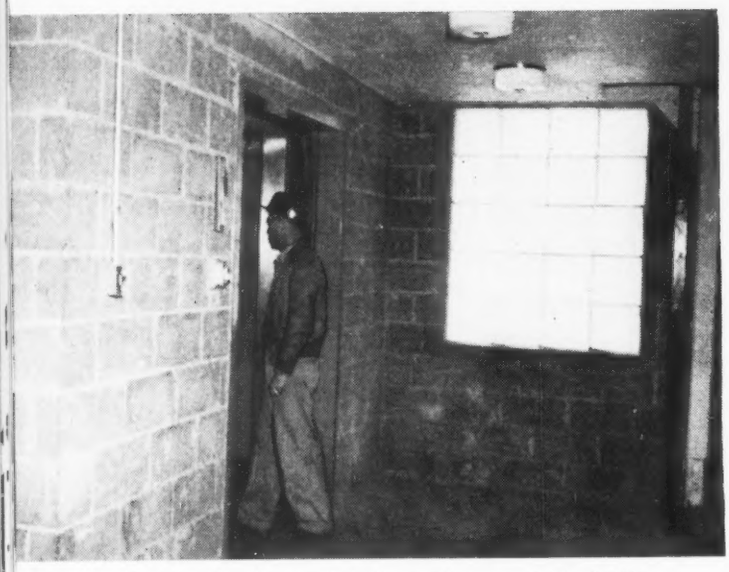
Willow Grove No. 10 Mine. Men formerly entered by the main drift portal near the tipple. Now they enter through a shaft near the present workings and ride down in a passenger elevator. Large circles and the letters therein indicate panels where mining is now underway.



Second floor of the service building, showing lamp-room and waiting-room connected to the shaft which serves as an upcast for the new fan and the runway for the passenger elevator.

First floor of the service building. The miner's washhouse is on the second floor.





Entering the elevator from the waiting-room in the building.



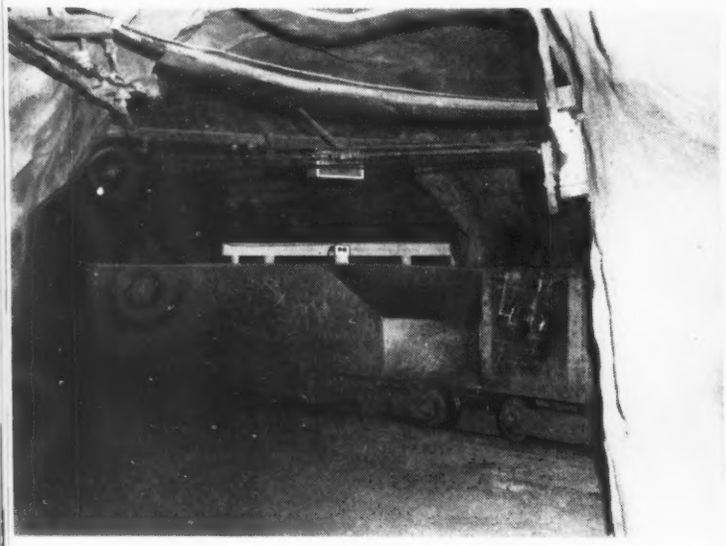
Leaving the elevator down in the mine.



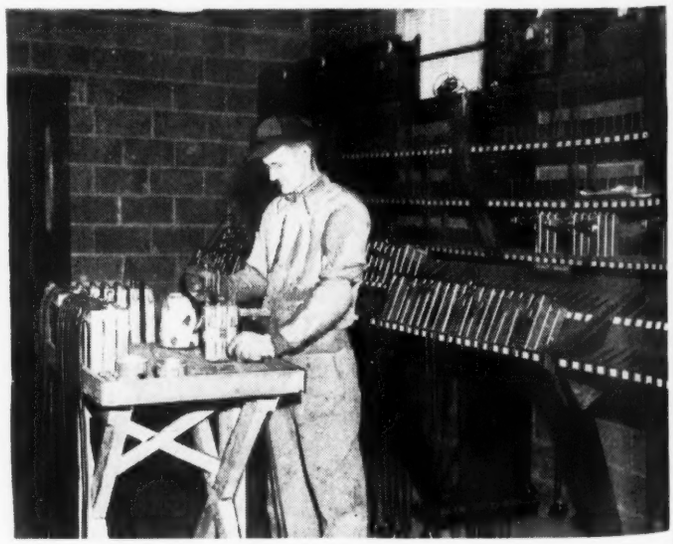
This underground office, with J. C. Lukasko, mine foreman, in the chair, is directly in front of the elevator landing. Just this side of the office, the men, on their way into the mine, turn left through a corridor 8 ft. wide and 100 ft. long.



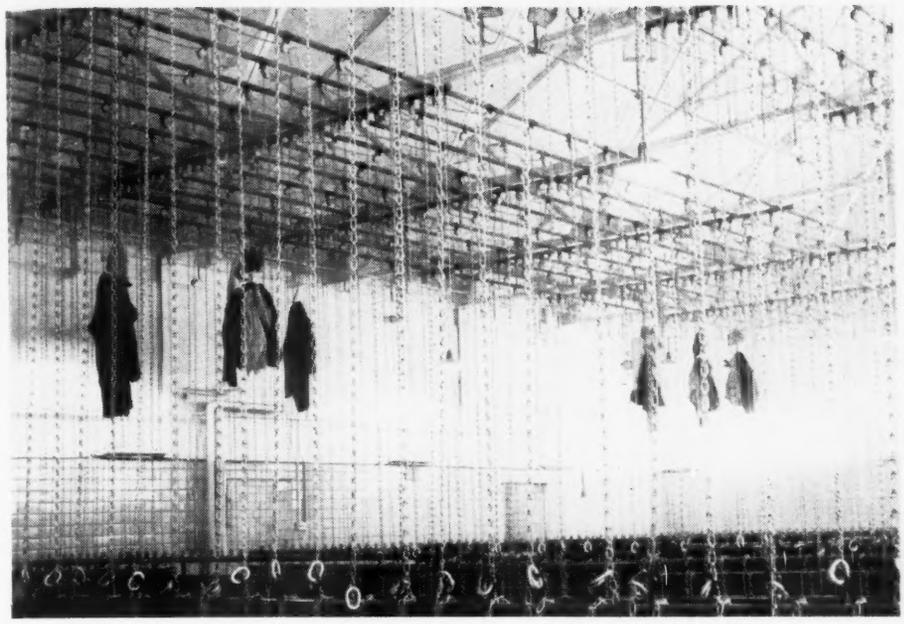
At the end of the corridor, men go through a revolving door into the mine. A lighting fixture flush in the wall can be seen near the point of the arrow. The gunited roof and plastered walls of the corridor are painted white.



Out of this passageway, a short distance inby the revolving door, men board the man-trip. Mine cars are eight-wheeled units with a capacity of 10 tons of coal and are loaded by track-mounted mobile loaders operating three shifts.



When miners pass through this lamp-room, the work bench is wheeled to the lamp-repair room. Miners take lamps from and replace them in the low racks. The lamp-man puts them in the charging racks.





Left—Baskets and hangers are provided for 500 men. Walls are glazed tile up to 7½ ft. Twenty germicidal lamps disinfect the air. Right—The miners' shower-room has glazed tile to the ceiling.

button controls by the lampman. Double doors on the cage and shaft open and close automatically. The closing is by spring action, and the door can be blocked by the toe or a gentle push with the hand or shoulder. Electrical interlocking makes it impossible for the car to start until both doors are fully closed. The control panel in the car includes a pushbutton for emergency stops and for control during a maintenance job. The car is wired for a telephone, which will be installed as soon as received. It will be used only in an emergency or in maintenance. All standard safety devices, including a centrifugal governor, limit switches, etc., are incorporated in the installation.

From the elevator landing at the foot of the shaft, a few steps lead down into a small lobby that faces the door and window of an underground office to the left. From this lobby, a corridor 8 ft. wide and 100 ft. long ends at a revolving door leading into a gunited passage facing the side track. The gunited roof and plastered walls of the underground lobby and corridor are painted white and the lighting fixtures of the corridor are set in the walls flush with the surface. The revolving door is collapsible for emergencies.

Building Set Up for 500 Men

The two-story service building connected with the elevator installation has steel framing, concrete-block walls, wood purlins and Careystone corrugated roofing. Heating plant, mine offices and foremen's wash- and change-rooms are on the ground floor and the



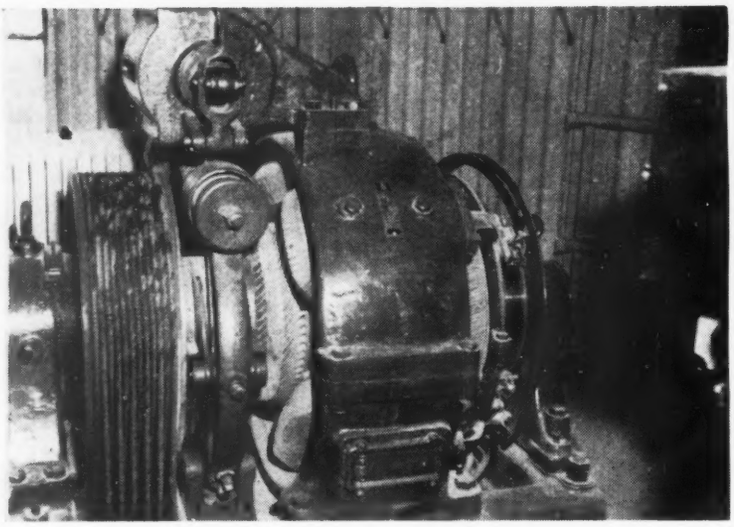
James Hyslop, vice president in charge of operations, gets the miners' reactions to the new bathhouse and portal.

miners' washhouse and the lamp-room are on the second floor. The miners' change-room, 49x81 ft., is equipped with 500 hangers. About 450 men use it but the maximum on one shift is 200 men.

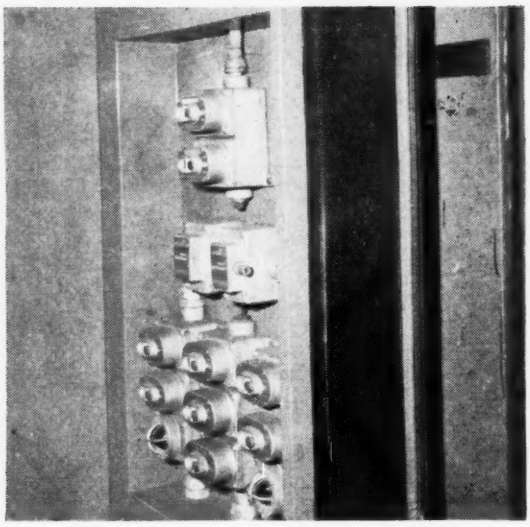
Walls of the miners' shower room, 12x81 ft., are lined to the ceiling with glazed tile, which also is used 7½ ft. up on the walls of the change-room. Concrete floors are curved at the wall corners to facilitate cleaning. Navy deck paint containing an abrasive has been applied to the concrete floor to form non-skid walkways between change benches and showers. In the change-room, 20 germicidal lamps, mounted 8 ft. from the floor and shaded from the eyes, disinfect the air which circulates around the hanging clothes.

Unit heaters in the change-room have flop valves and ducts to the outside. Consequently, they also serve for changing the air in the room. Automatic controls effect a change of air when temperature and/or humidity get too high.

The plan of the second floor is shown in an accompanying illustration. The men enter and leave through a double-doored vestibule divided by a pipe railing. On their way from the change-room to the elevator, they walk through the center of the lamp-room and pick up their lamps from semi-self-service



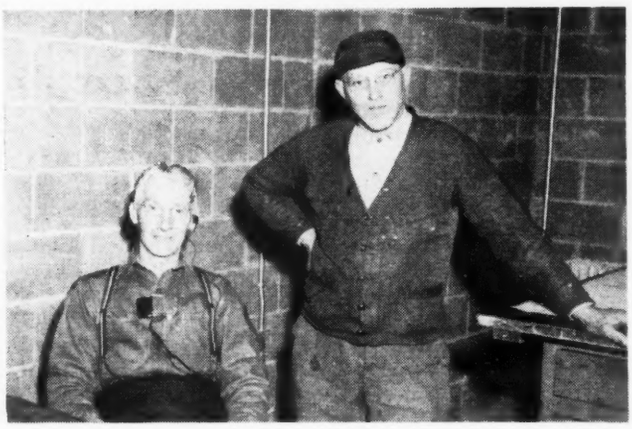
The elevator car is handled by this gearless-traction-type unit.



Pushbutton control panel inside the elevator car.



J. C. Lukasko (left), mine foreman, Willow Grove No. 10 Mine; F. R. Zachar, superintendent; and C. L. Brown, mining-electrical engineer, U. S. Bureau of Mines, Pittsburgh.



F. C. Sanner (left), mining engineer, and J. L. Schrum, construction foreman, Willow Grove No. 10 Mine.

racks. From the elevator waiting-room, a utility or emergency door leads directly to the outside. A window in the payroll office faces the outgoing traffic in the vestibule.

The semi-self-service lamp racks for the M.S.A. Edison cap lamps are considered more satisfactory for those lamps than a true self-service arrangement. A lamp man must be employed anyway and he uses proper care in opening the lamps, placing them on charge and closing them ready for use. Instead of having a stationary bench in the lamp-room the lamp man uses a small bench on casters. On it, he waters lamps and, when necessary, wheels them into the adjoining repair room.

Heating of the building and water for bathing is done with a horizontal return tubular boiler, made by the Titusville Iron Works. Operating pressure is 6 lb. The furnace is fired by a Stokol automatic stoker. In the same room with the boiler is a 5,100-gal. hot-water tank. A thermostatic control governs the steam fed to the internal coils so that the temperature of the bath water can never exceed 160 deg. F. Each of the 40 showers is equipped with a mixing faucet, with which each man can control the temperature of his bath water within the limits of 160 deg. hot to approximately 42 deg. cold. Normally, the bath-water supply is surface water from a 250,000-gal. reservoir formed by a small dam close to the bath house. This water is pumped to a 25,000-gal. tank on the hillside, from which the water feeds by gravity to the washhouse.

Two drilled wells furnish drinking water and each floor of the service building has an electric water-cooling fountain.

Office rooms on the ground floor are not elaborate, walls being cement blocks without plaster. Fluorescent lighting is used in these offices. Visitors were not forgotten by the planners and designers of the building. Opening off the superintendent's office is a room having a toilet, shower booth, benches and several clothes lockers which can be assigned to visitors who wish to change clothes and wash or bathe after a trip underground.

This service building, including the washhouse and heating arrangement, was designed by Allen & Garcia.

Parent-Company Officials

George M. Humphrey, Chairman of the Board, Pittsburgh Consolidation Coal Co.

George H. Love, President.

D. L. McElroy, Vice President (Engineering).

Hanna Officials

R. L. Ireland, President.

James Hyslop, Vice President in Charge of Operations.

James D. Reilly, General Manager of Underground Mines.

Frank R. Zachar, Superintendent, Willow Grove No. 10 Mine.

Julius L. Schrum, Construction Foreman in Charge of Erection of the Building.

Dewey Jones, General Mine Foreman, Willow Grove No. 10 Mine.

R. E. McCormick, Chief Electrician, Willow Grove No. 10 Mine.

GROUND PROTECTION

For A. C. Circuits Around Coal Mines

Hazards of Ungrounded Circuits—Protection Must Also Be Provided Against Insulation Failures in Motors—Practical Methods for Good Grounding — Grounding of Rotary Converters

By JOHN W. HARRIS
Deputy Ohio Mine Inspector, Blaine, Ohio

WITH UNGROUNDED a.c. circuits, as shown in Fig. 1, a ground on one of the phase wires, such as *ag*, will put that phase wire at ground potential and raise the phase-to-ground voltage of the other two phase wires to full phase-to-phase voltage. There will be no interruption in service and the system may be operated indefinitely with this single ground remaining unknown.

This is a dangerous condition.

A second ground on another phase wire, as at the frame of the motor (indicated by *AG*), will produce a short circuit on the system and a heavy current may flow. This rate of current flow will be limited by the over-all impedance which, including the resistance of both grounds, involves these factors:

1. Power source.
2. Transformers.
3. Phase wire from Ground *ag* to transformer.
4. Ground at machine frame *AG*.
5. Phase wire from transformer to *AG*.
6. Contact of machine and earth.
7. Path of current through the earth.

Protection against this condition is not afforded by the usual protective schemes for power-distribution systems employed around mines. Should a man standing on the ground touch any part of the frame with these faults present, he would be subjected to the phase-to-phase voltage in the circuit, which will be divided proportionately according to the impedance of each different part of the circuit. With the high resistance of the contact between the frame of any machine and the ground, a large proportion of the full voltage probably will appear across this point of contact and a man will receive a severe or fatal shock.

Under these conditions, with no ground connection to the machine, the fault current may not be large enough to trip the circuit breakers, as it would be limited by the impedance of the circuit plus the resistance between the frame and earth. Even if the current flow is sufficient to operate the circuit breakers, the voltage between the machine frame and ground will be present during the time required for the protective relays and circuit breakers to operate.

Copper sheaths have been wrapped around the conductors of some cables and these are used at some mines for grounding. This copper taping was added primarily to reduce the effect of corona on the insulation. Such grounding as this does not protect against the hazard of life in event of insulation

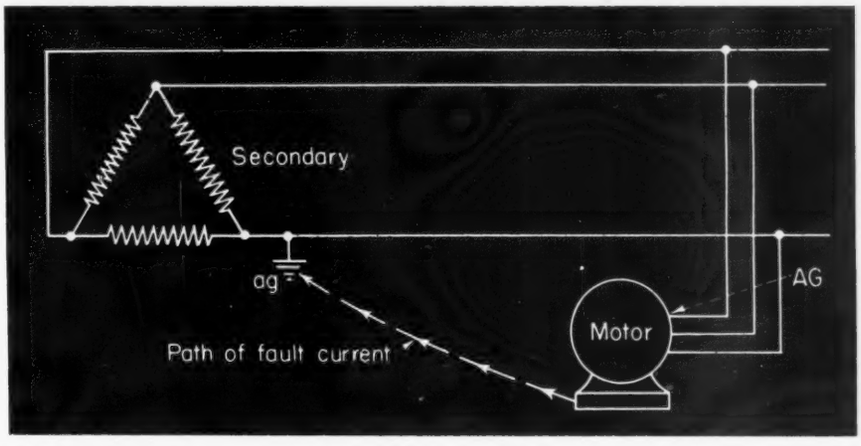


Fig. 1—With an ungrounded system, faults may not be discovered for some time, with prolongation of the hazard.

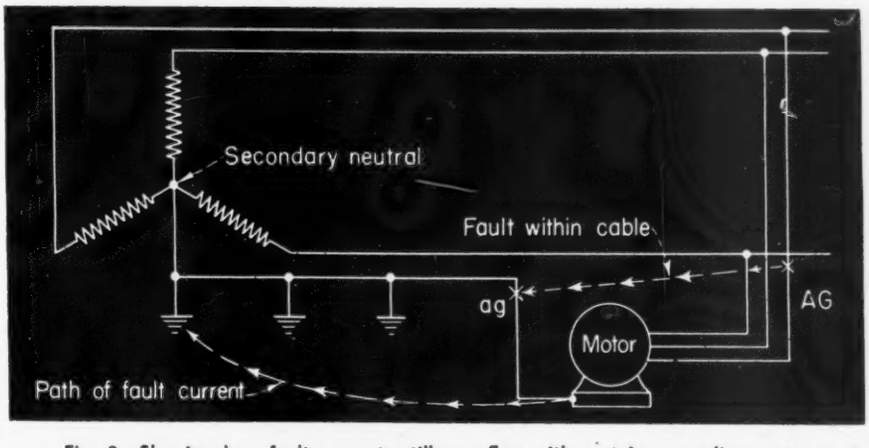


Fig. 2—Showing how fault currents still can flow with certain grounding systems.

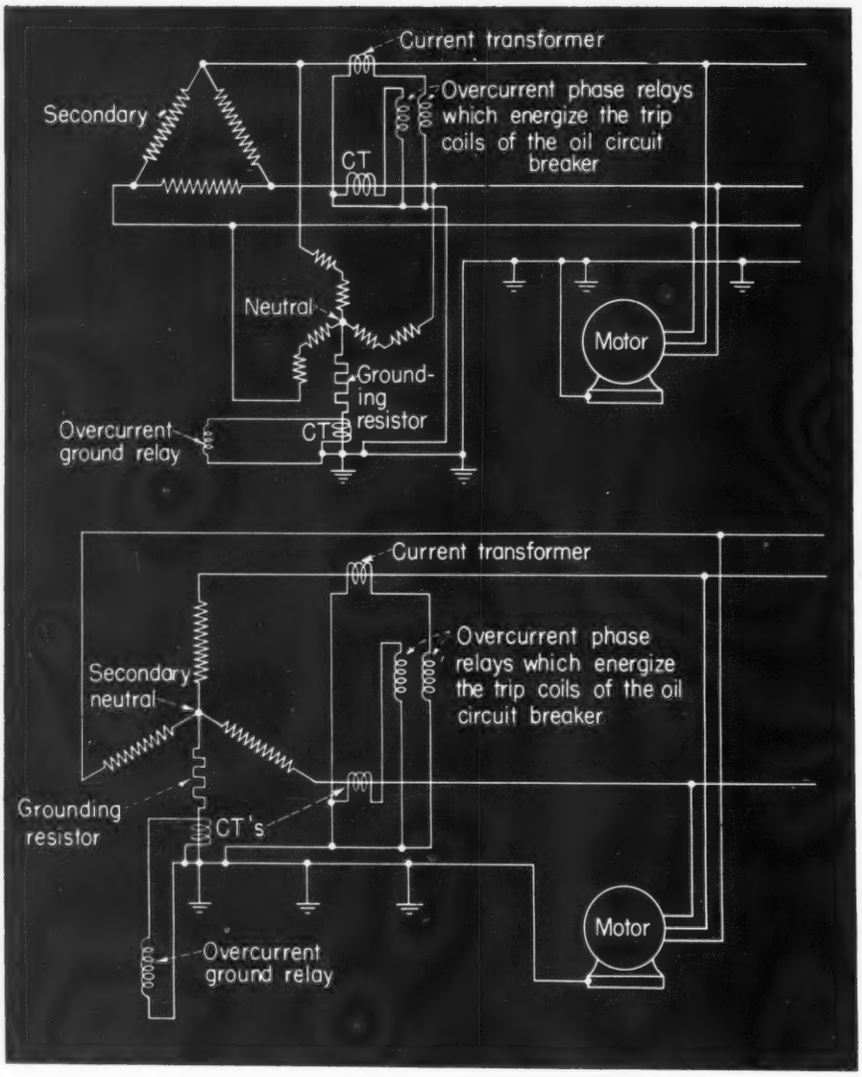


Fig. 3—Practical grounding systems offering the most-positive action and the best protection yet devised.

failure. Ground wire added to cables connected at one end to frames and at the other end to ground rods or boreholes, are equally dangerous. Actually such ground protection is wholly inadequate.

In some distribution circuits, using Y-connected secondaries, the ground wires connect the frames to points along the line (ground rods) and to the transformer neutral and the substation ground.

Fault Currents in Grounds

With the ground connections shown in Fig. 2, in the event of insulation failure to ground on a phase wire at *AG* fault currents may be expected in the circuit, including the cable ground wires and the grounds to which they connect since, under ordinary circumstances, this will be the circuit of least impedance. Some current will flow through the contact of machine frame to earth and thence to the faulted phase wire. But if the contact resistance of frame to earth of the machine is high in comparison with the grounding points, this current will be relatively small. Under usual circumstances, the resistance will be of the order of 10 ohms or, usually, more.

It must be noted that with solidly grounded neutrals, ground faults on any phase wire in the lines will cause the voltage of the ground wire to rise above earth potential by the amount of the voltage drop in the ground connections. At the same time, the voltage of any machine frame or other apparatus connected to the ground wire will rise above earth potential (voltage) by the same amount. This voltage cannot be held low enough for safety to personnel, even when multiple ground rods are driven or installed to make the resistance of the ground connections as low as possible.

The plans shown in Fig. 3 are believed to be the most positive in action and most practical systems yet developed for safeguarding life against the hazard under discussion. While these two latter systems of ground-current limiting and relaying will protect life against dangerous voltages between frames of machines and ground in cases of *single* ground faults from phase to ground, the protection will be largely lost if another phase wire faults simultaneously. Then, grounded equipment frames, or ground wires, will make no difference for practical purposes if the fault occurs in the ground wire in a cable or to the frame of a machine, since such faults would produce short-circuit conditions and a dangerous voltage would appear between earth and frame of any equipment or ground wire connected to it. Isolation of the circuit on which the first fault occurs as rapidly as possible affords a great deal of protection against the second ground fault.

My observation is that ground protection of 440- and 220-volt circuits generally is omitted. This practice is not to be recommended. While the principal aim is to improve the protection of 2,400-volt and higher circuits, this is not to say there is no need for similar protection on 220- and 440-volt circuits. Men have been killed repeatedly on 110-volt circuits. Protecting 220- and 440-volt circuits naturally means more costly equipment and the general tendency, it seems, is to avoid the additional cost and take a chance on the lower-voltage circuits.

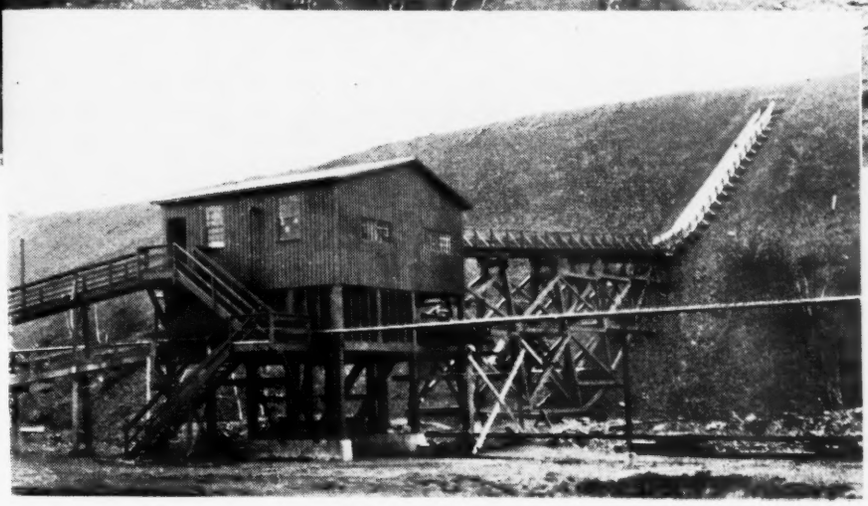
Grounding Rotary Converters

It should be made a standard practice to ground rotary converters through a shunt-trip coil to the automatic breakers or hand-operated equipment. In case of flashover, the current will be limited by the coil resistance and the voltage that sustains the arc reduced at once to a low value by the voltage drop across the coil. Connection to the negative lead should be made, especially at mines where dry rock ballast is used.

If the above conditions cannot be met, then the frame should be connected through the relay with a 3-ohm resistance in series to the negative lead. The result will be a weak arc to ground, limiting the ground current. This prevents the accumulation or ionization of conducting gases due to vaporization of the commutator copper at the point where the arc is established between the commutator and ground.



General view of the new silt-preparation plant of The Hudson Coal Co. Left is the screening house and next to it the spiral separator plant. Dewatering conveyors from the final settling tank appear at the far right.



The silt bank from which the new spiral concentrator bank will draw most of its material is shown behind the screen house. A scraper will bring the silt to the chute.

SPIRAL PLANT
Converts Silt Into Better Boiler Fuel

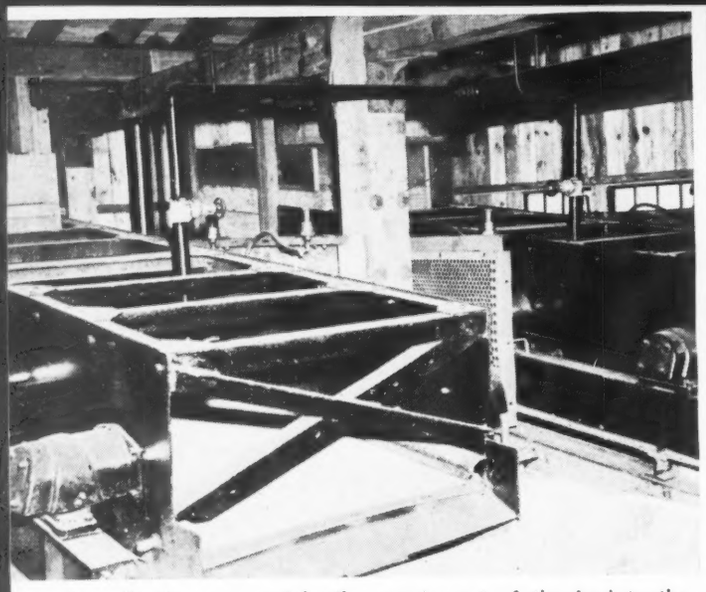
Hudson Coal Co. Silt-Preparation Plant Cleans Minus 28-Mesh Anthracite in 48 Spiral Concentrators — 750 Tons of Better Boiler Fuel Produced per Day From Silt Bank and Thickener Underflow

★ ★ ★ ★ ★ ★

BRINGING in a new and economical source of fuel for one of its power plants, The Hudson Coal Co. put a new silt-preparation plant using spiral concentrators into operation at its Powderly colliery, Mayfield, Pa., in April, 1947. The start of operations at this new plant marked the fruition of investigation and testing that got under way with the erection of a small pilot plant in September, 1945.

To supply power for its various collieries, The Hudson Coal Co. operates several electric generating plants, including the Coalbrook plant where the boilers were designed to burn silt on special chain-grate stokers. The fuel problem and approach were summed up by H. H. Otto, assistant general manager—engineering, and Vaughn H. Wilson, special mining engineer, in a paper on the pilot plant presented at the Fifth Anual Anthracite Conference, Lehigh University, as follows: "With the great demand for fine sizes of anthracite and the necessity of burning the smallest possible sizes in our generating plants, we decided to carefully study the fuel problem and our possible sources of supply."

That study revealed a silt deposit of approximately 1,500,000 tons, built up over 50 years, at Powderly colliery. That quantity was sufficient to supply the needs of the Coalbrook power plant approximately ten years, aside from the regular, although diminishing, output of the Powderly breaker. In the search for an economical means of



Two vibrating screens take the oversize out of the feed to the spiral concentrators.

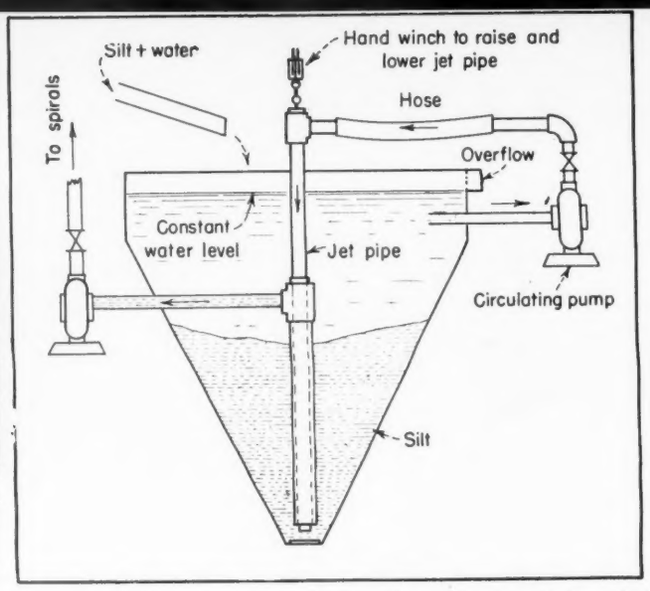


Diagram of the construction and operation of feed tanks for spiral separators, showing use of water jet for agitation.

preparing the coal, investigation of the spiral separator was suggested and study of the unit resulted in a decision to build a pilot plant and later the full-scale commercial operation. Design and construction were handled by The Hudson Coal staff, with advice from I. B. Humphreys and the staff of the Humphreys Investment Co., who developed the separators. Others besides Messrs. Otto and Wilson of The Hudson Coal staff who had a major hand in the project include: E. M. Snyder, mechanical engineer; J. S. Johnson, superintendent of preparation and maintenance; and W. L. Dennen, engineer.

Cleaning of the silt, which runs 75 to 85 percent minus 28 mesh, with the remainder coarser material up to 3/16 in. (all over that is screened out) is done in 48 Humphreys spiral concentrators in eight batteries of six separators each. Six batteries handle the primary feed and two treat "refuse" from the primary units. Each separator consists of six full turns on a 10-in. pitch. Separator diameter is 24 in.

An accompanying illustration shows part of one turn with the material flowing. As the water and feed material run down the spirals, the coal, being lighter, rides up on the outside and goes all the way to the bottom, where it is discharged. From the clean coal the feed grades into heavier "middlings" and then into "refuse," which do not ride up as far and remain toward the center of the spiral, the separation becoming more pronounced as the material moves down toward the bottom of the unit. To remove "middlings" and "refuse" a series of ports with 1-in.-diameter orifices is provided toward the inside of the turns. A small disk with one-quarter of it cut out is laid in a countersunk recess in each port. Turning the disk one way or the other increases or decreases the split of "middlings" and "refuse" taken out in each turn. This material drops through the ports into launders for further handling as desired.

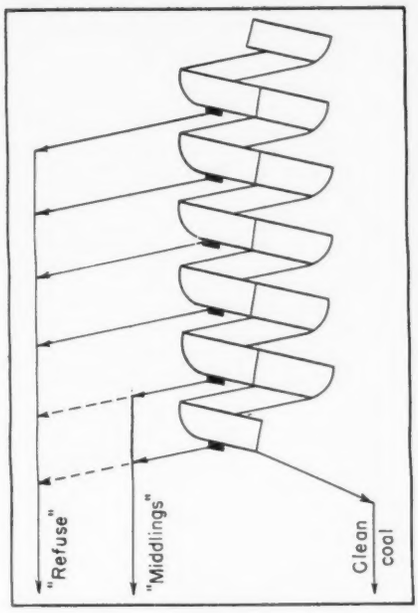
Usually, the take-off from the bottom one or two turns in the primary separators at Powderly is classed as "middlings" and is returned to the primary feed tank and retreated, while the material from the ports in the upper four or five turns in the primary units is

The "spider" in the lower part of this illustration equalizes the feed to the various spiral batteries by introducing angles and elbows in the longest lines.



Silt is cleaned for boiler fuel in these 48 spiral concentrators mounted in batteries of six each. The six batteries in the background do primary cleaning, with final cleaning in the other two.



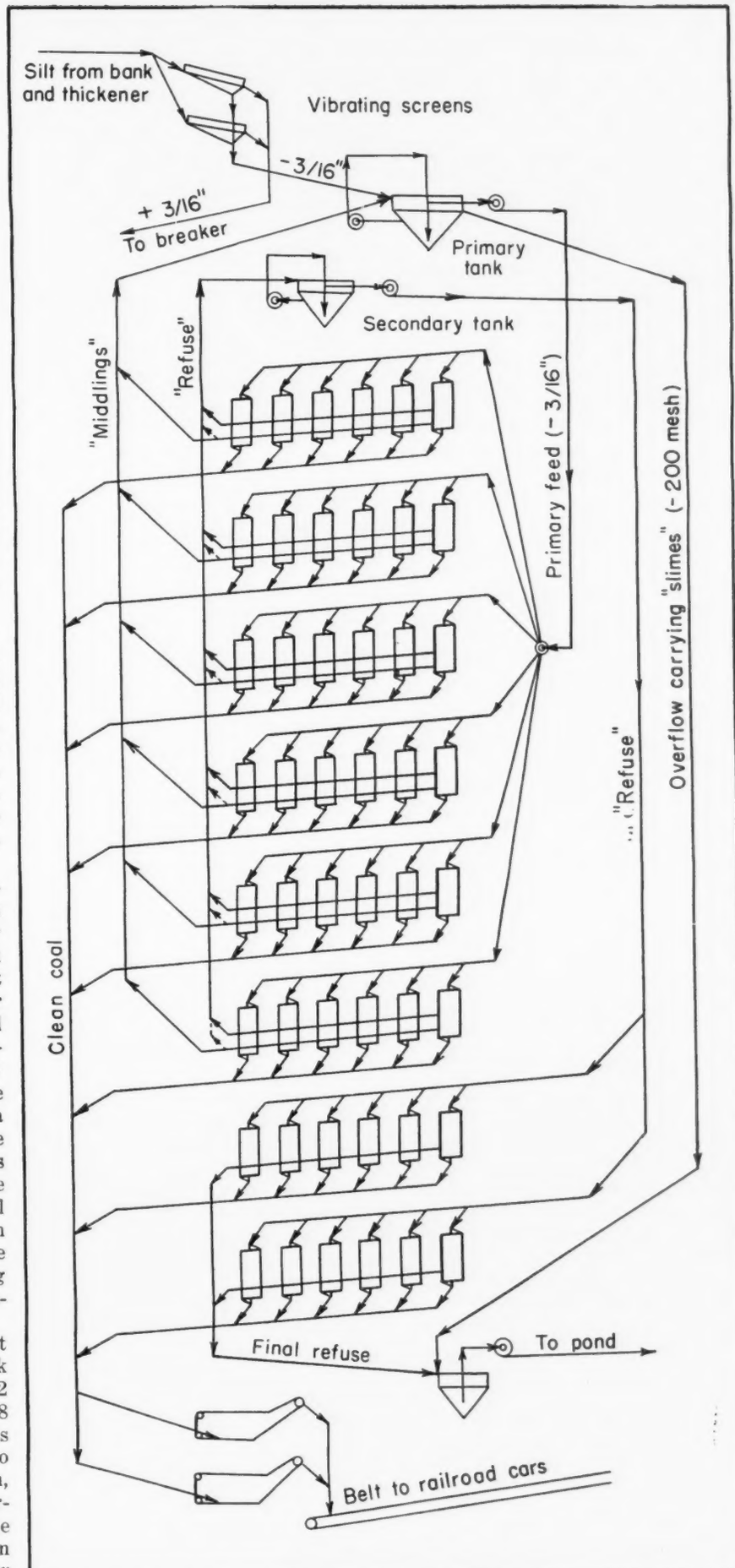


Single spiral concentrator showing take-off of various products under the general operating set-up for primary units at the Powderly silt-preparation plant.

classed as "refuse". In the secondary units, treating "refuse" from the primaries, the take-off from all ports is refuse. An auxiliary channel on the inside of the separator turns carries water, and small adjustable diverters bring it as necessary to the inside of the separator turns to keep the heavy-gravity material moving.

The new Powderly silt-preparation plant handles material from the breaker but will get its major supply from the old silt pile. Wash water from the breaker (about 19,000 g.p.m. carrying 40 tons per hour of material nominally 3/32 and smaller) goes into a Dorr thickener. The underflow (3,500 g.p.m.) was pumped to the silt pile in the past. Now, the same pump, with a rubber pinch valve to decrease the original 6-in.-line opening, moves the underflow (1,000 g.p.m.) to the new plant. The remaining material will be derived from the silt pile, on which a Sauerman dragline will be installed, with the scraper moving the material to a chute (see illustration).

Experience with the pilot plant shows that the concentrators work best on material smaller than 3/32 in. Most of the feed is minus 28 mesh. However, larger material is encountered and, consequently, to keep it from clogging the system, and also because these larger particles normally are rejected by the concentrators, the initial step in preparing the silt is to run it over two 4x12-ft. Tyler "Ty-Rock" vibrating screens fitted with square-



Flowsheet of Powderly silt-preparation plant of The Hudson Coal Co., producing 750 tons of clean silt per 24-hour day.



Spiral concentrator in action, showing disks for splitting out "middlings" or "refuse."

mesh cloth to make a separation at 3/16 in. The particles over 3/16 in. are returned to the breaker for re-preparation.

Material smaller than 3/16 in. through the screens is flumed to a feed tank (design shown diagrammatically in an accompanying illustration). The top cylindrical section is approximately 3½ ft. deep. The over-all diameter is 18 ft. and the depth is 20 ft., the lower part being a cone. The material is drawn off and pumped to the primary separators by a 1,000-g.p.m. centrifugal pump through a center column. Inside this column is an agitator pipe fed by recirculated water through another 1,000-g.p.m. pump by means of a hose connection. This pump also is fitted with a rubber pinch-valve bypass, or bleeder, for use as needed.

The agitator pipe is raised and lowered by a hand winch to change the percentage of solids in the flow drawn off by the pump feeding the separators. Normally, the solids in the feed to the separators is about 20 percent. The feed tank also is arranged for an overflow, which carries "slimes" (approximately 200-mesh) directly to the tank receiving the final refuse. These slimes average around 6 percent of the feed into the plant.

From the feed tank, the 1,000-g.p.m. feed pump delivers the "pulp" (to give it its technical name) to a "spider" feed distributor, which splits the feed evenly between the six batteries of primary separators. Equalizing the friction in the several lines is accomplished by adding elbows and turns in the headers leading to the various batteries, the added resistance compensating for the shorter runs to the nearer units. The distribution runs terminate in risers with six-way outlets on the tops, each outlet feeding a separator through a rubber hose. The hoses are clamped to the outlets in such a fashion as to leave air openings, which prevent the tendency toward creation of vacuums and consequent irregularity in the feed.

Clean coal from the bottom of the primary spirals goes to a settling tank equipped with two Wilmot dewatering conveyors. These conveyors put the coal, with the surface moisture reduced to 20 to 23 percent, onto a belt conveyor leading to the railroad-car loading station.

"Middlings" from the bottom one or two turns of each spiral run about as high in ash as the feed, although the quality varies with the setting of the splitters and the turns in which they are located. Generally, however, the middlings are returned to the feed tank for recirculation, although they may also be sent to the secondary concentrators for further treatment there. The arrangement is made flexible so that the flow can be altered to meet conditions.

"Refuse" from the top four or five turns of each primary concentrator goes into a feed tank similar to the primary feed tank, although slightly smaller (14 ft. in diameter and 16 ft. deep). Water is recirculated for agitation by a 350-g.p.m. pump and pulp is withdrawn for movement to the secondary concentrators by a second 300-g.p.m. pump.

The secondary, or final-cleaning, installation, as previously noted, consists of two batteries of six concentrators each and retreats "refuse" from the primaries. The concentrators make two products: clean coal, which goes to the settling tank, and refuse, which goes to a 14x16-ft. refuse tank, where it is joined by the slimes in the overflow water from the primary feed tank. From this refuse tank a 1,500-g.p.m. centrifugal pumps the material to a 13-acre settling pond. Water leaving this pond to flow into the stream system complies in every way with Pennsylvania State requirements on stream pollution.

The Powderly silt-preparation plant is designed to provide a 17- to 19-percent ash coal for, as noted, the Coalbrook power plant. Consequently, it will not be operated to do as good a cleaning job as is possible, tests in the pilot plant showing that the concentrators were capable of getting the ash down to as low as 9 percent, with a corresponding reduction in recovery. By adding to the number of turns and by re-treatment, it is believed possible, if it were desired to do so, to get practically 100-percent theoretical separation. In contrast with the product of the Powderly plant, silt previously used in the Coalbrook power plant ran 17- to 22-percent and sometimes 25-percent ash or more. Usually, the ash content was in the 20's. Aside from uniformity and a generally lower average ash, the power plant operating staff reports that the Powderly product burns satisfactorily on the chain-grate stokers.

Recovery 65 to 70 Percent

The ash content of the feed to the Powderly silt-preparation plant (containing, among other things, cone-cleaner sand) varies from 25 to 40 percent. Recovery in reducing it to the desired averages of 17 to 19 is 65 to 70 percent of the minus 3/16-in. feed from the preliminary vibrating screens.

At the ash and other operating conditions at Powderly, the capacity of each spiral is about 1½ tons per hour. The output of the new plant, which will operate for the eight non-freezing months of the year, is expected to be 750 tons of clean silt per 24 hours from a feed of better than 1,000 tons. On the first of the three shifts, the plant operates on material from the breaker. For the second and third shifts, when the silt dragline is installed, it will operate on bank silt.

Two men per shift operate the plant—usually one in the screening and the other in the cleaning section. The plant is expected to be low in maintenance and power cost because there are no moving parts in the cleaning equipment.

MINING AND LOADING:
Past Progress and Future Prospects

Continuous Mining and Loading, Without Cutting, Drilling and Shooting, the Next Major Step to Save Labor in Coal Mining—Problems in Design—Major United States and Foreign Machines

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WITH the machine firmly established as the chief means of reducing cost of coal mining, it is logical to ask this question: "Where will the greatest strides be made in additional cost cutting in the future?" One obvious answer is getting more out of present machines. Another is the development of new types of machines—specifically mining-and-loading units adaptable to most of the variations in underground conditions.

Although much can be done to increase productivity with present types of machines, it still is in order to review attempts to develop new units and speculate on the forms they might take. The goal is simplification of the present mining cycle and the elimination of as many steps as possible, since cutting, drilling, bugdusting, shooting and the like require additional labor and investment. True, a machine that would render all these things unnecessary in addition to handling loading might cost considerably more than a unit specifically for loading. However, it is doubtful if that cost would exceed the aggregate cost of the several units now employed and there is reason to believe it would be less. Certainly, the labor cost would be greatly reduced and there also is the possibility of substantial savings in the supplies now required in face preparation.

If tons per man could be doubled tomorrow, the cost of coal would be cut at least $1 per ton in the bituminous industry and more than $2 in the anthracite industry. Coal's competitive power would be sharply increased, along with other advantages. Present equipment, properly operated, can easily provide tons-per-man figures double the present industry averages in deep mining. As an example, one company operating a number of mines in 5- and 7-ft. coal has attained an over-all average of more than 10 tons per man by the installation of loading machines and modern auxiliaries, accompanied by intensified application of accepted operating principles. Even in thin coal —around 4 ft.—efficiencies of around 10 tons or better have been attained at a number of properties and the list is growing.

Along with conventional loading equipment, the operator in quest of more tons per man now can benefit by the use of machinery in fields hitherto restricted to hand work. An example is bugdusting by machine. Another is machine transporting and lifting in timbering. A third is power positioning of drilling heads. Better cutter bits save greatly in labor. And so on. Consequently, the road to higher efficiency with present types of loaders is being made easier every day. In the future—perhaps fairly soon —the operator can expect the additional advantages of the true mining-and-loading machine — the next major step in underground mining.

To get coal out of the solid requires the expenditure of energy in one form or another. The old-time miner supplied the energy in digging it out with a pick. The puncher was a mechanical adaptation of the hand-pick idea, and one of the early mining-and-loading machines used a puncher mounted on a chassis carrying a conveyor to put the coal in the car. Cutting is the second principle that has found expression in a number of machines,

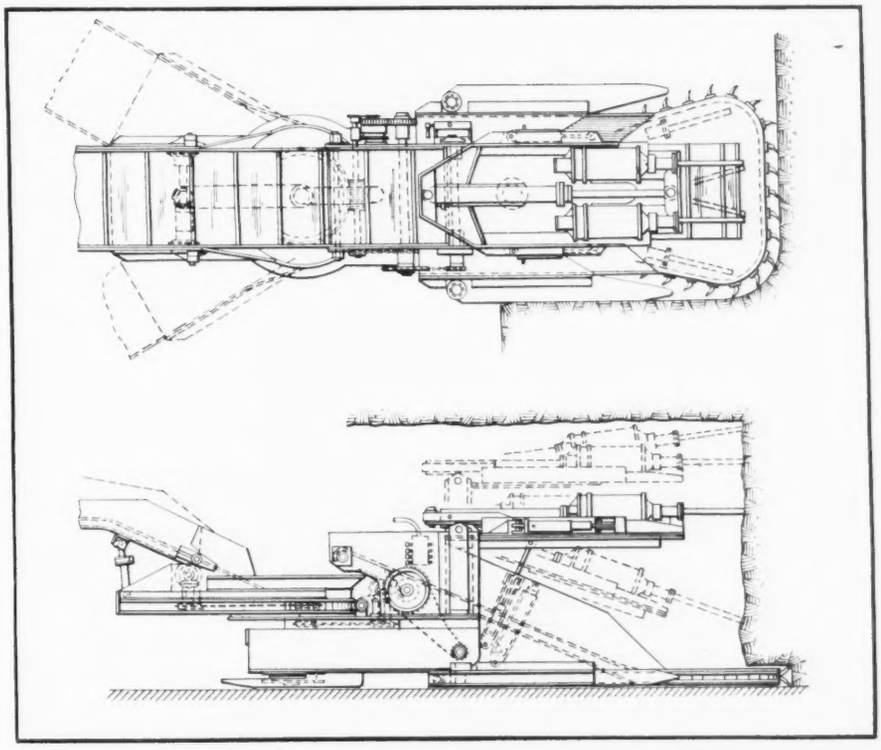


Fig. 1—Konnerth mining-and-loading machine using pressure and vibration to create resonance and break down the coal for loading.

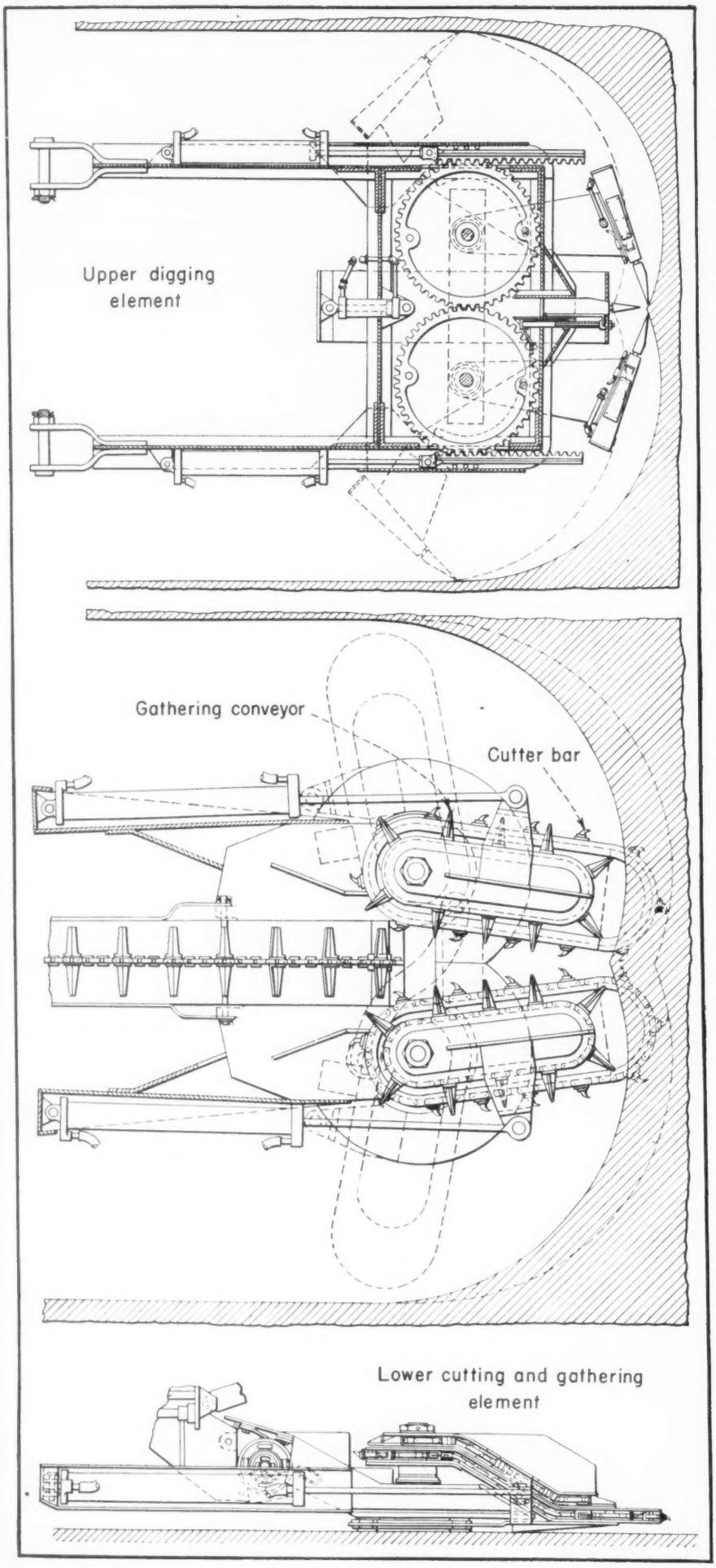


Fig. 2—Major elements in the Julian continuous digging-and-loading machine.

including several in use today on an experimental or production basis. In some instances, cutting was or is accompanied by wedging. A third principle is vibration. In one machine, the objective is to set up resonance in the coal through pressure and vibration, which resonance causes it to break up. In all cases, it will be noted, energy is required as a substitute for the energy normally gained from explosives or other breaking mediums.

Since picking, cutting, wedging and vibration are about the only logical ways of breaking coal, unless explosives or hydraulic, gas or mechanical pressure are employed, it is not surprising that both early and recent designs of mining-and-loading machines employ one or a combination of these principles. The puncher-conveyor combination, known as the Ingersoll-Rand heading machine, was used as early as 1913 at the Four States Coal & Coke Co., in northern West Virginia.

Cutting an Early Method

Cutting with boring-type heads was the principle employed in one of the earliest mining-and-loading machines, developed from the Stanley header (originally a cutting and breaking unit) introduced into this country from England, via the Franceville mine, Colorado, in 1888. A unit equipped with a conveyor, thus making it a true mining-and-loading machine, went into service in the Bennett mine, Illinois, in 1890. It and other similar early machines were the forerunners of the McKinlay entry driver, first used by the Southern Coal, Coke & Mining Co., Belleville, Ill., in 1920. McKinlay machines, employing twin boring elements side by side, are being used successfully by at least one mining company today.

Cutting and wedging were combined in the Jeffrey entry driver installed by the Bailey-Wood Coal Co., West Virginia, in 1913. Breast-machine-type bars cut the coal on the bottom and two sides, while wedge-pointed bars broke it down into a conveyor feeding to mine cars. Many modifications of the cutting principle have been suggested or tried over the years, including a series of bars one over the other, revolving drums and so on. Several foreign mining-and-loading machines developed for thinner seams use a varying num-

ber of cutting and shearing bars.

Planing, using the picking or cutting principle, was developed in Germany during the war and will be tried in the anthracite region in this country. Hooked up with a face conveyor, the plane, in several versions, is designed to mine and load off a semi-longwall face.

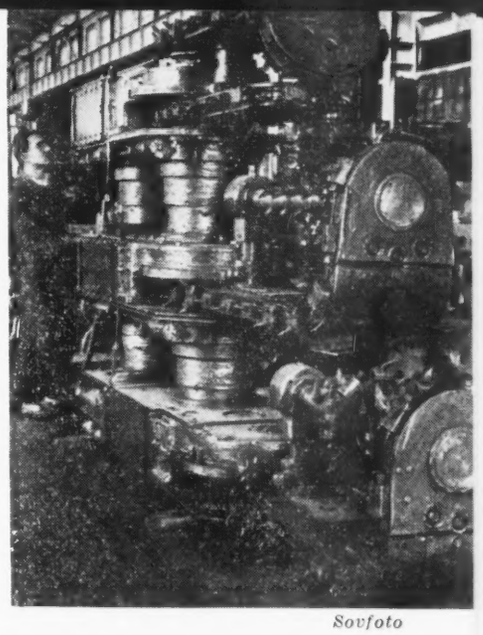
Recent mining-and-loading machines actually built in the United States include the Julian, patented by John H. Crawford and being developed by Crawford-Oliphant, Inc., Vincennes, Ind. This machine has undergone substantial modification since the first unit was tried in an Indiana mine. The latest model comprises two main elements —one for undercutting and gathering the coal to the loading conveyor and the other for digging. As shown in Fig. 2, the lower element consists of two short double bars swung from side to side by hydraulic jacks. The lower part of each bar undercuts the coal, while the upper part is a paddle conveyor for gathering the coal to the central loading conveyor.

The upper element, which is the digging head, can be raised and lowered by jacks to operate at various levels in the seam. It is fitted with a central digging, or demolition, tool, and with two swinging digging tools, one on each side. Swinging in scissors-fashion is accomplished by jacks and racks. All three digging tools (air hammers and teeth in steel frames) are equipped with springs and valve gears for air operation at 900 to 1,000 hammer blows per minute at 90 to 100 lb. per blow. "This makes it possible," according to the company, "to dig anything that can be drilled with a jack hammer drill." The machine is mounted on crawlers.

Resonance Employed

Pressure and vibration, combined with shallow undercutting, are the major principles involved in a mining-and-loading machine patented by Karl L. Konnerth, assistant to the president, H. C. Frick Coke Co., and still in the experimental stage. Actual loading with this machine is done in the conventional manner. In mining, however, a breast-machine-type cutter bar forward of the loading head cuts a shallow kerf and the coal is broken down by setting up resonance in it by means of two hammers pressed against the face by a hydraulic or air cylinder. The hammers are vibrated at a rate that will produce the desired resonance. As shown in Fig. 1, the hammers may be raised and lowered or swung to one side or the other. The patent states that the number of vibrations ranges from 1,000 to 2,000 per minute. The principle by which the coal is broken is the same as breaking a glass by playing a certain musical note. The Konnerth machine is designed to be moved across the face by ropes and jacks similar to a short-wall cutter.

Several other suggestions for mining-and-loading machines have been made over the years. Accelerated development is expected as a result of the research program announced by Bituminous Coal Re-



Sovfoto

Fig. 3—Russian cutting, crushing and loading machine.

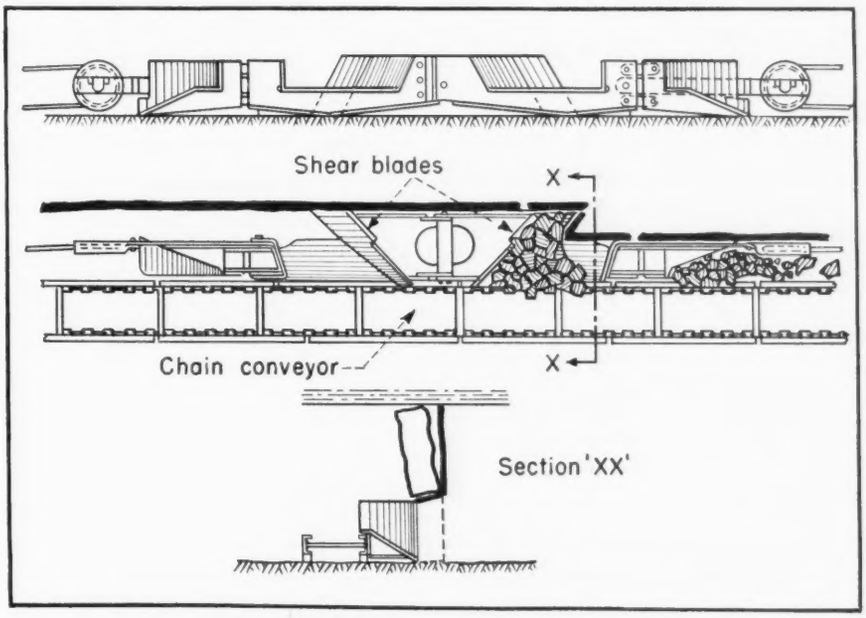


Fig. 4—Simplest type of coal planer with accompanying face conveyor.

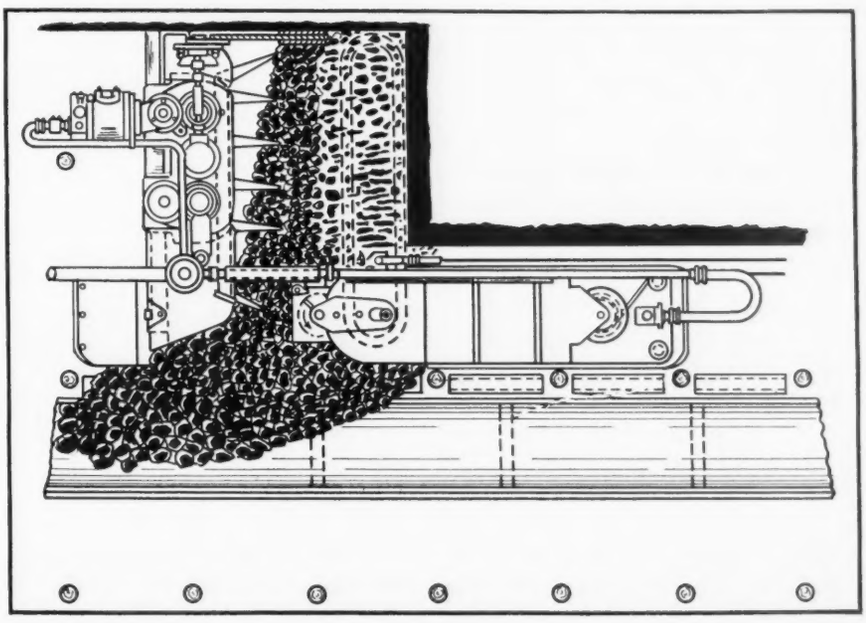


Fig. 5—One type of German mining-and-loading machine—the Demag—for semi-longwall mining in thin coal.

search, Inc. Such machines also have been the subject of considerable study in other countries. Russia claims a number. One is a "mechanical mole," or "underground submarine," operating on the boring principle. Another Russian idea is shown in Fig. 3. While the information available is not too definite, the coal cut out and broken up apparently is discharged to a gathering conveyor. It is reported that 300 of these machines will be operating by 1950.

In addition to the coal planer, Germany, as well as Great Britain, has developed several machines employing cutting or cutting and shearing to get the coal out of the solid. The coal planer (see Fig. 4 and also March, 1947, *Coal Age*, p. 65), as its name indicates, is designed to be pulled back and forth across a semi-longwall face by a hoist or hoists, picking or cutting out the coal, which is forced up a ramp, as a general rule, onto a face conveyor laid alongside. As stated, one version of the coal planer is to be tested in the anthracite region.

One of several German cutting and loading machines is shown in Fig. 5. This Demag unit, used on a face approximately 450 ft. long, was designed for coal 3 to 4 ft. thick. It was pulled across the face to cut and load and then was returned to the other end to repeat the cycle. One bar undercut the coal, with another vertical one at the back shearing it off the solid. A paddle conveyor moved the coal onto an "underbelt" conveyor—a type frequently used overseas where the coal is pushed sideways onto the lower run. With eleven men, the output of the machine was stated to be about 250 tons per shift in 3-ft. 3-in. medium-hard coal.

British mining-and-loading units —primarily for semi-longwall work in thin coal—include the A. B. Meco-Moore and Logan machines. Last December, it was reported, at least 17 mines in Great Britain were using the Meco-Moore machine and 25 others had it under consideration. First installed at the Bolsover colliery in 1945, the machine was developed from an early prototype first tried around 1930. At present, the machine requires a working height of at least 4½ ft. However, models for coal as thin as 3½ ft. are reported to be under development.

Three cutter bars remove the coal in the Meco-Moore unit. One undercuts to a depth of 6 ft., with another overcutting about 2 ft. higher. A third vertical bar shears the coal loose from the solid at the back. A screw conveyor puts the coal on a face belt. According to one report, the machines at Bolsover are operated by crews of 11 men and will cut and load a face 6 ft. deep and 105 ft. long in seven hours.

The Logan slab cutter (Fig. 7) comprises one undercutting bar making a kerf 28½ in. deep, an overcutting bar, a shearing bar operating at the back of the cut and a severing bar which is rotated into the standing coal at intervals of 6 ft. or more to cut it loose in front of the machine. Making the severing cut, it is stated, requires about 50 seconds. The coal, broken out by a plow, is carried out on a short conveyor and discharged to a face conveyor. Speed of advance ranges from 9 to 54 in. per minute, it is reported. The machine can be operated in coal as thin as 3 ft., according to published claims. The Meco-Moore unit is designed to work both ways, while the Logan machine operates one way only.

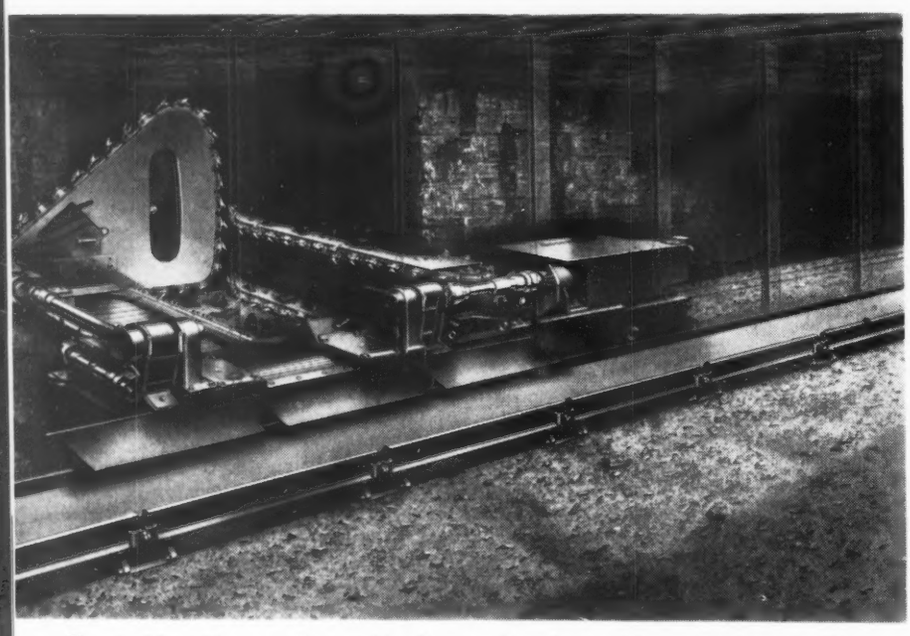
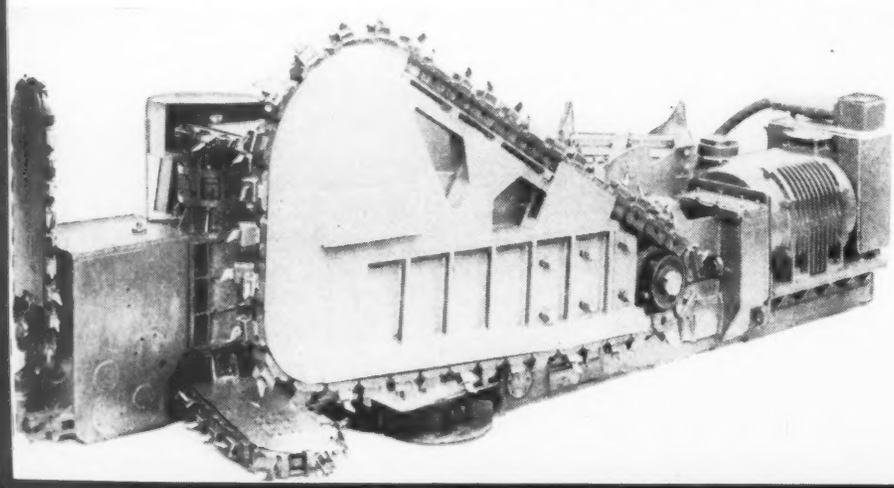


Fig. 6—Meco-Moore cutting-and-loading machine for semi-longwall mining in thin coal.

Fig. 7—Logan slab cutter and loader for semi-longwall mining in thin coal seams.



Simplified Cycle the Goal

What form mining-and-loading machines eventually will take in the United States still can only be guessed at. However, there is reason to believe that, as with present equipment, types for thick and thin coal will be required and that they may be different in many respects. Whatever the form, however, the cycle will be simplified by eliminating cutting, bugdusting, drilling, hole loading, shotfiring and incidental inspection. If the mining-and-loading machine can handle—as it undoubtedly will—tonnages equal to or exceeding that of present machines, a great saving in labor will be possible. Presumably, machines will be developed that will be adaptable to present room-and-pillar systems. However, where the coal is thin, it may be that continuous mining and loading will require greater use of long-face and semi-longwall mining plans, which, theoretically, at least, lend themselves better to a continuous mining and loading cycle.



Second day of loading in the new pit. This shovel, with 1¾-yd. dipper, strips and loads. The truck road starts down the hill just this side of the buildings in the right background.

WITH PLANNED STRIPPING

12 Men Get 900 Tons on First Day

Production Started Eight Days After Shovel Moves to New Pit—Scrapers Aid in Overburden Removal—Sections Skipped for Gas Lines and Underground Mining—Good Maintenance the Watchword

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ON THE FIRST DAY of coal loading, 35 days after a bulldozer started to grade a road from the paved highway to the crop line and only eight days after the combination stripping and loading shovel was moved onto the job and put into service, Oscar O. Hall mined 900 tons of coal at his outcrop stripping at Wilsonburg, three miles from Clarskburg, W. Va. With but 12 men on the payroll he averages 1,000 tons per day, reaches peaks of 1,200 to 1,400, and, even with the present short car supply, is able to ship about 4,000 tons per week. This new pit was opened in January with the same crew and equipment he used in a pit just completed at Hepzibah, a few miles away.

For 20 years or so prior to 1943, Mr. Hall had operated and maintained shovels and this know-how, combined with his habit of spending most of his time in the pit, explains the dispatch and efficiency of the work. Occasionally, he even operates the strip shovel for a shift. He believes in having good equipment, treating it with due consideration and, above all, keeping ahead on maintenance.

Equipment includes two shovels, both of them used for stripping and loading. The larger is a Lorain high-lift unit capable of handling a 2-yd. dipper but equipped with a 1¾-yd. Amsco dipper with teeth of the same make. This shovel has a 30-ft. boom, a 27-ft. stick and is driven by a Waukesha-Hesselman diesel. The smaller shovel is a ¾-yd. Lima.

Four International crawler trac-

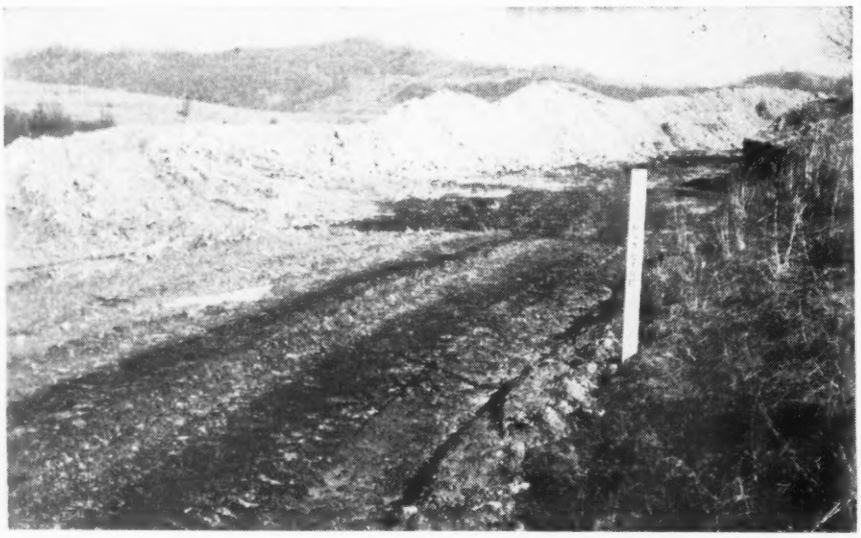


From the paved highway in the background, a road 800 ft. long was graded up the hillside to the crop line. Because the pit will have a short life, a permanent road was not built. Body of empty truck tilted back throws weight on the rear wheels and reduces spinning when the road gets slippery. The grade being steep, the loaded trucks going down can negotiate fairly soft and muddy surfaces.

tors operate bullgraders and wheel scrapers, locally termed "pans." Three of the International tractors are TD-18s, one of which pulls a Bucyrus-Erie 8- to 10-yd. pan and the other a LeTourneau 8-yd. pan, while the third operates a Bucyrus-Erie "Bullgrader." The fourth and smaller tractor, a TD-14, also is equipped with a Bucyrus-Erie "Bullgrader."

Two Hardsocg gasoline-driven rubber-tired drills, one for horizontal drilling of the overburden and the other for vertical drilling of coal, complete the list of pit equipment. Typical of the care given to machinery, the sidewall drill appeared brand new when it arrived at the new operation after finishing up at the previous pit. Before transfer, it was overhauled and carefully painted to protect parts from rusting and to restore the bright, clean appearance which causes an operator to treat a machine with greater care.

On the present job, Mr. Hall is stripping a 1¾-mile length of Pittsburgh seam outcrop. Seam thickness is 7 to 9 ft., bounding a territory which has been underground mined and in which about 16 in. of top coal was left to protect the slate and shale roof. About



The white post says "Gas Line." This is part of an 800-ft. stretch of crop line to be skipped because of three gas lines. In the foreground is the road for moving equipment. In the background is the top of the coal of a first cut.

Two pans and two bulldozers working in the pit which Mr. Hall completed in January.



2,000 ft. of the outcrop will have to be skipped because of openings from the old underground mine, buried gas lines and hollows. Elevation of the outcrop is approximately 80 ft. higher than the paved highway at the point where the entrance road leaves the highway.

Deep-Mine Holes a Hazard

Total recoverable coal is estimated at 9.2 acres and the tonnage will run approximately 9,000 per acre. Most of the underground workings are full of water. Where the 16 in. of top coal has continued to support the roof, precautions are necessary to keep equipment from breaking into the holes. Assuming that the car supply will permit four days of loading weekly, the life of this pit will be approximately six months.

Haulage from the loading shovel to the railroad tipple is done with 14 end-dumping trucks carrying 8 to 10 tons each. Eleven are rented on a per-ton basis, with drivers furnished, and three are owned and operated by Mr. Hall. One is a Ford and the others are Dodges. Although the latter are over a year old, they still look like new. The driver of one of the trucks owned by Mr. Hall informed the writer that he kept the truck polished and waxed himself. When coal is not being loaded, these three trucks are available for hauling rock for roads. Their operation affords a yardstick for reasonable pay per ton to the haulage contractors.

From the paved highway to crop-



Pans have worked up and down at the right, moving dirt over the hillside to the left, and have temporarily completed their job in this section of the pit by leveling a way for the shovel.



Typical view after the shovel has squared the highwall off at 8 to 10 ft. and exposed the first cut of coal 40 ft. wide.

Looking down into a water-filled underground opening showing the 16 in. of top coal left for roof support.

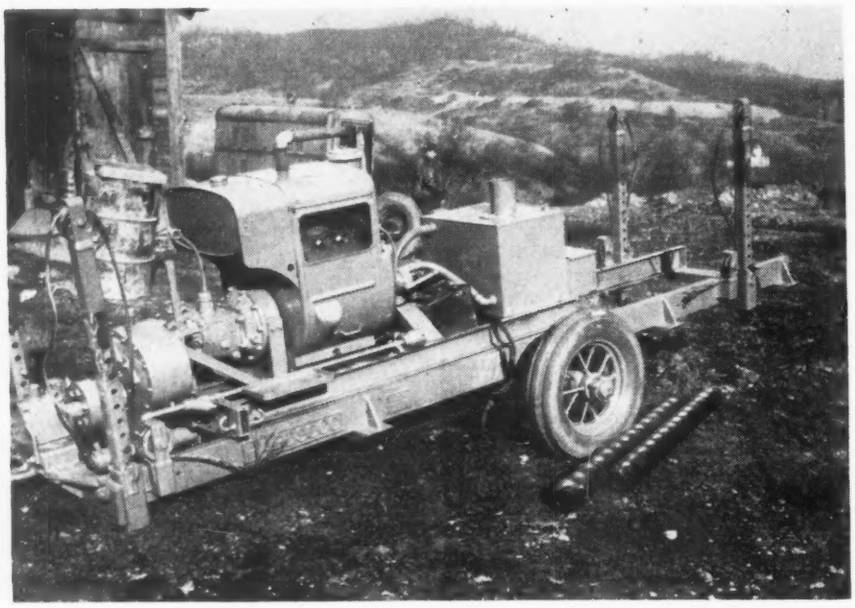


Oscar O. Hall standing on top of the coal near a room or entry left after underground mining.



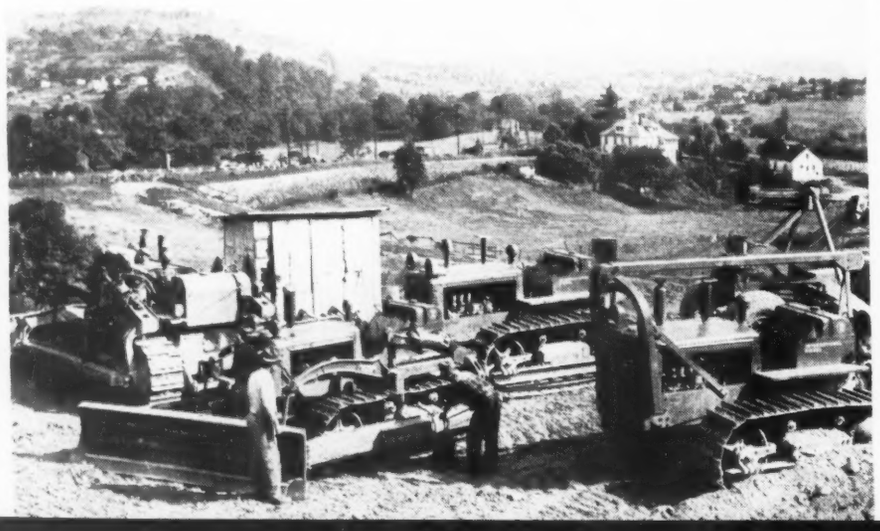


Gasoline-driven coal drill with larger shovel in background. Two rubber-tired drills are in use, one for horizontal overburden drilling and the other a vertical coal drill.



Care in operation, good maintenance and a fresh coat of paint made this sidewall drill look like new as it started work in this latest pit. Its appearance encourages the operator to treat it with care.

The four diesel tractors, two with bulldozers and two pulling pans, are shown here at the pit finished in January.



line level at the center of the pit, the new road is 800 ft. long. Its average grade is about 10 percent and the maximum approximately 14 percent. Because of the short life of the pit and the fact that the grade is in favor of the loads, rock is used but sparingly on the road surface. Piles of rock are kept along the road and shoveled into the holes by hand when conditions get bad. If the road gets so slippery that the empty trucks have trouble climbing the hill, the bodies are tilted back to throw more weight on the rear wheels and reduce weight on the front.

One Shift Worked Normally

As a rule, all equipment is worked but one shift per day. The exception is one bulldozer, which a night watchman operates part-time after finishing his job of greasing equipment. That watchman is one of the crew of twelve. The others are: pit man, who greases and cleans up around the loading shovel; one man drilling and shooting overburden and coal; shovel operator; two bulldozer operators; pan operator; pit foreman; check weighman; two truck drivers and one office man. The pit foreman, Argyle Hall, is a brother of Oscar O. Hall.

Only a few trees are encountered at this strip pit. After a bulldozer has cleared a way around the crop, the next operation is for a pan to work up and down the hillside, moving dirt out beyond the crop until the excavated slope gets too steep. Then the pan takes a few cuts across the slope parallel to the crop line, thus leveling a way for a shovel to work in squaring up the cut to an 8- to 10-ft. highwall, exposing a 40-ft. width of coal.

40-Ft. Holes Drilled

Sidewall drill holes in the overburden are started in the slate about 2 ft. above the coal and are angled upward if there is limestone to break. This upward angle places the explosive closer to the stone and farther from the coal. The 5-in. holes, 40 ft. deep, are loaded with 50C American Cyanamid gelatin.

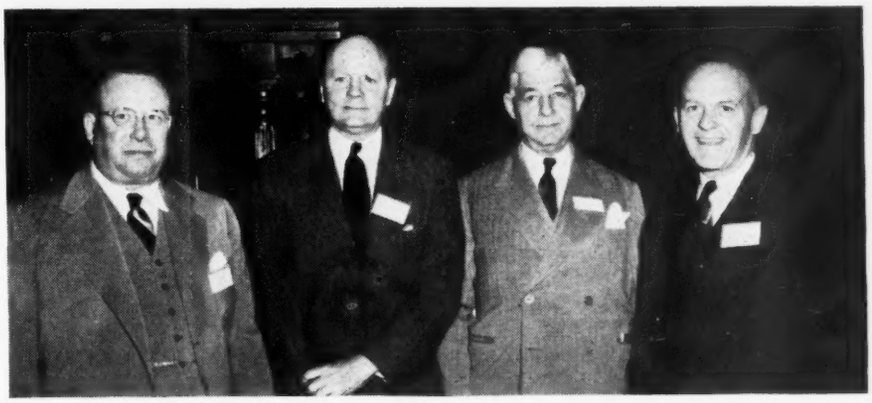
Either the large or small shovel, as previously noted, may be used for loading coal, depending on the set-up on a particular day. Flexibility and improvising are made possible by having plenty of equipment and by Mr. Hall being in the pit much of the time. These go a long way toward explaining the large tonnage achieved with a few men.

COAL PROGRESS

Spotlighted at Cleveland Convention

NEW coal-mining equipment, better mining and stripping methods and measures to promote safety were the high spots of the annual coal convention of the American Mining Congress held in Cleveland, Ohio, May 12-15. More than 8,900 coal-mining men and representatives of related manufacturing industries gathered for the meeting, which included the first equipment show in four years.

Pointing to past achievements of the coal industry and speaking briefly about the needs of the future, Julian D. Conover, secretary, American Mining Congress, opened the general session Monday morning, May 12. Mr. Conover presented the following: Harry Moses, president, the H. C. Frick Coke Co., and chairman, Coal Division, American Mining Congress; Thomas McNally, president, the McNally-Pittsburg Mfg. Corp., and chairman, Manufacturers' Division, American Mining Congress; R. H. Morris, vice president, Gauley Mountain Coal Co., and chairman of the convention floor committee; and George H. Love, president, Pittsburgh Consolidation Coal Co., who presided over the morning session.



Harry M. Moses (left), president, H. C. Frick Coke Co., chairman, Coal Division, American Mining Congress; George H. Love, president, Pittsburgh Consolidation Coal Co., national chairman, program committee; Thomas McNally, president, McNally-Pittsburg Mfg. Corp., chairman, Manufacturers' Division, American Mining Congress; and Julian D. Conover, secretary, American Mining Congress.



First-session speakers—Dr. C. J. Potter (left), Rochester & Pittsburgh Coal Co.; E. R. Ambrose, American Gas & Electric Service Corp.; and E. P. Carman, Coal Division, U. S. Bureau of Mines.

Face Cycle Offers Savings

In the first address of the Monday morning session, C. J. Potter, assistant to the president, Rochester & Pittsburgh Coal Co., speaking on "Some Phases of Labor and Economics in the Coal Industry," declared that in the search for lower coal prices, rail and water transportation costs, managerial and selling costs, supply costs and taxes offer little hope for economies. Even such production services as main-line haulage, ventilation, transportation, power and communication, drainage, tipple operation, handling of supplies and general maintenance offer only negligible opportunities for savings, because in them management already has achieved its highest efficiency. Even if they could be improved, said Dr. Potter, the savings would be only negligible because they represent a small part of production costs.

The most promising field for economies, the speaker declared, is in the ancient cycle of cutting, drilling, shooting, loading and face transportation, all of which bulk large in total cost and in which fewest improvements have been made. The answer, said Dr. Potter, is to reduce costs here, "not in term of labor's earnings but in terms of increasing labor's productivity." This means devising machinery to do the job and attracting men who can "originate, improve and operate and direct the operation of the machinery," he concluded.

Discussion of Dr. Potter's address was offered by E. R. Kaiser, assistant to the president, Bituminous Coal Research, Inc., who summarized the work of a temporary steering committee of B.C.R. to consider development of new mining methods. The committee, Mr. Kaiser reported, has recommended a fund of $250,000 for starting the two-year project, to be raised as follows: $200,000 contributed by coal-producing companies, based on 2 mills per ton of 1946 production; $30,000 contributed by coal-carrying railroads, based on 1/10 mill per dollar of gross coal-traffic revenue from bituminous in 1946; and $20,000 contributed by coal-land-owning companies, based on 4/10 mill per ton of the 1946 production of lessees. Provided these or similar plans materialize, said Mr. Kaiser, a permanent Mining Development Committee will be set up and a Director of Development appointed, together with a technical advisory committee.

Continuing the Monday morning program, E. R. Ambrose, air conditioning engineer, Associated Gas & Electric Service Corp., addressed the session on "The Heat Pump for Comfort Heating and Cooling." The potential market for heat pumps, Mr. Ambrose declared, offers the coal industry "one way of offsetting the unfavorable competitive situation that coal is now under when compared with other fuels in the residential heating market." The speaker, showing slides to illustrate the heat-pump cycle, discussed the design and efficiency of the heat pump and its

favorable operating cost and stated that the potential market would require 100,000,000 tons of coal per year to supply electricity on a basis of 1.29 lb. of coal per kilowatt-hour.

In the discussion following Mr. Ambrose's address, A. P. Carman, fuels engineer, U. S. Bureau of Mines, emphasized the possibility of a year-round market for coal to be provided by the heat pump's ability to heat in winter and cool in summer. Drawing on his experience with a heat pump in his own home, Mr. Carman claimed that comfortable temperatures and convenience are provided and that no storage space, fireplace or chimney is needed.

Use of the heat-pump principle for residential group heating was suggested by T. A. Landry, fuels engineer, Battelle Memorial Institute. Emphasizing the high cost of distributing hot water from a central plant through insulated pipe in a district heating system, Mr. Landry pointed out that if the temperature of the output water from the central plant is kept at 90 to 95 deg. F., it will be low enough not to need insulation but high enough to provide efficiency for the heat pump in the individual residence, thus necessitating only a small central heating plant for a group of homes. Mr. Landry also advocated building the heating and cooling mechanisms into a single unit to cut costs and save space in the residence.

Deep-Mining Highlights

MINING methods with power duckbills and shortwall loaders, and mechanical loading with large and small crews were features of the mechanical loading session May 13 presided over by L. C. Campbell, vice president, coal division, Eastern Gas & Fuel Associates.

Economic competition from the larger strip mines with washers and cleaning plants and smaller truck mines with unorganized labor forced the mechanization of their Fulton County operation in Illinois, said John Pschirrer, vice president, Pschirrer & Sons Coal Co., Canton, Ill. A duckbill installation in 1942 followed a trial operation with chain conveyors in the 48-in. Illinois No. 5 seam, where the top is fair and fireclay is soft. Tons per man doubled with duckbills where 30-ft. rooms on 40-ft. centers were driven 375 ft.

A three-entry system on 40-ft. centers with 28-ft. pillars, crosscuts and necks 12 ft. wide, permitted starting new rooms without hand loading. A belt is installed in the middle entry. The coal is undercut with hydraulically-controlled shortwall machines equipped with 8½-ft. bars and automatic bugdusters. A 7½-ft. cut, said Mr. Pschirrer, produces about 33 tons per fall. Four men constitute a crew in the room and three in the entries.

A four-man crew averaging two and one-half falls per day (82.5 tons per seven-hour shift) drives a room up in 17 shifts. Moving time from a finished room to a new room and setting up ready to go, is six hours. Much time is saved on the long moves by using a 500-ft. ⅝-in. steel rope instead of doing it in 50-ft. relays with the machine rope. The shortwall is spotted and a come-along and the 500-ft. rope are used to speed up the moving operation.

Servicing at the face is by a false pan line 6 ft. to the right and parallel to the regular pan line. Supplies are delivered to the roomneck by reversing the belt. Pans (size 1½ troughs) filled with the necessary supplies are added to the false pan line at the roomneck. When the regular pan line has to be extended, the false pan line is pulled up by the machine rope, one pan length at a time. After the room has been driven half way, all servicing is completed for the remainder of the room.

Tons per man, added Mr. Pschirrer, immediately went up and labor costs went down after the first power duckbill was installed in 1946. Its ability to move by power laterally across the place, its higher capacity and the ability to drive rooms 45 to 50 ft. wide were all improvements over the older type machine. The same crew in 45-ft. rooms, loading three falls per shift (33.75 tons per face man), would complete a room in 14 shifts of seven hours each. However, moving time for the new type is seven hours instead of six. An extra hour is needed because of the longer duckbill unit. Since the power duckbill operates in a carrying frame there is no bottom resistance or friction. As a result, 26 troughs are used in the pan line to drive the rooms 407 ft.

The "Shortwaloader" is a combination cutting-loading machine which undercuts and loads simultaneously, thus approaching the ideal for continuous loading unit, said C. E. Hough, general superintendent for the American Rolling Mill Co., Montcoal, W. Va. A loading rate of 1 ton per minute can be maintained in a 42-in. seam, declared Mr. Hough, but the loading and discharge conveyors will handle 2 tons per minute.

The "Shortwaloader" has operated successfully in 34- to 60-in. seams. Soft or weak bottom affects the operation and efficiency of the equipment the same as a shortwall cutting machine. Where soft bottom is encountered, the shoe of the hydraulic leveling jacks, which provide the vertical adjustment required for cutting a smooth bottom, should be larger and turned up on all sides. The machine, continued Mr. Hough, cannot be operated successfully where the roof is not sufficiently firm to hold the feed rope jacks.

While the rated capacity of the "Shortwaloader" is only slightly over 1 ton per minute, production is continuous except for the time required to move the machine back across the face, extend the conveyor line and shoot. A five-man crew working in wide work, or rooms, consists of the loader operator, loader helper, driller, shotfirer and utility man, who operate on a six-step cycle as follows: (1) starting with a fresh cut shot down, the loader operator and helper run the machine across the face, loading the coal and putting in a fresh cut; (2) the driller and shotfirer drill holes for the next cut, following the machine across the face; (3) holes are drilled on the left side of the face while the machine is being moved to the right side; (4) during this time the utility man is moving supplies to the face, preparing for extending the conveyor and setting permanent timbers; (5) the driller and utility man extend the room conveyor, set timbers and rock dust while the shotfirer charges the holes and the machine operator and helper set bits and lubricate the machine; (6) the new cut is shot and the cycle repeated. Temporary roof jacks used at the face for safety posts are moved by the operator and helper during the loading operation.

Cutter-Loader Results

Two machines in 19 days of double-shift operation in two 20-ft.-wide entries with favorable top and bottom advanced each entry slightly over 1,000 ft., including crosscuts and roomnecks. Crews consisted of four men, who delivered all supplies to the face on the regular shift, and the average advance per face shift was 29.5 ft. One machine with a five-man crew advanced a 36-ft. wide room 291 ft. in ten shifts. A small portable moving hoist is used for moving the chain-conveyor equipment to new set-ups. A trained crew can move from a completed room to the next room and load as many as three cuts in one shift. The room-and-pillar system is best suited to this equipment. The machine will permit the driving of crosscuts between entries on 50-ft. centers, but production is somewhat handicapped and the distances should be kept under that figure when possible. Best performance is obtained in 40- to 50-ft. rooms.

When mechanizing, management must decide whether to operate with large section crews and high-capacity units to obtain high tonnage, or to operate with small crews and accept correspondingly smaller tonnages, declared G. N. McLellan, superintendent, Weirton Coal Co., Isabella, Pa. In his paper, "Mechanical Loading With Large Crews and High Tonnages," Mr. McLellan said he was referring particularly to experience at the Isabella mine and, while the

equipment was track-mounted, the same arguments would apply to similar equipment on rubber tires or crawlers. At Isabella, equipment was purchased and the organization for mechanical loading was made on the basis of working each mechanical unit as near its full capacity as possible to lessen investment cost and to obtain the best operating efficiency.

To maintain uniform tonnage from both development and pillaring work, 12 to 14 working places were required per machine on development and 18 to 20 on pillar sections. The standard leave for the crew coming on shift is two places ready to load, one place ready to shoot, one to cut and one to drill.

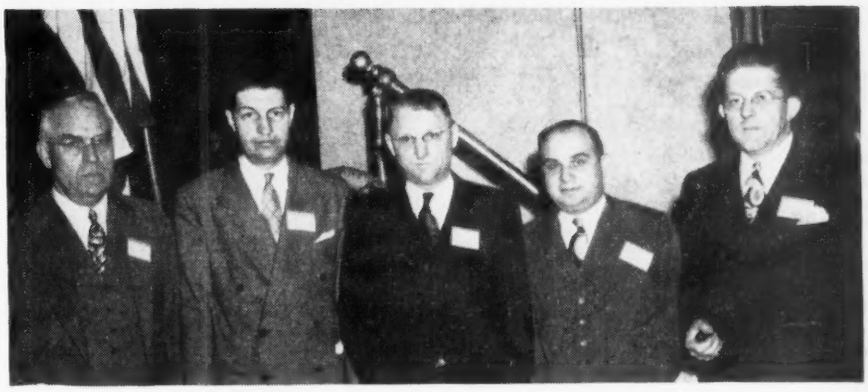
The standard crew at Isabella is 16 men, except in the sections using timbering machines. In these sections only 14 men are needed. Most operating men, said Mr. McLellan, watch the tonnage produced per man on the payroll, when it is the tons per dollar invested that pays off. Therefore, for real efficiency, all the equipment must operate at full capacity. This means providing plenty of places ready for the loading machine and keying all phases of the cycle of operation to that of the loader. Large cars, calling for fewer car changes, help to keep loaders busy more of their available working time.

As for job training, a man doing only one job will learn faster and better than if he goes from one occupation to another. Besides, he will take more of a personal interest in the job and will do it more efficiently. The loading crew, made up of the men on the loading machine and gathering equipment, is the "spark plug" of the entire section. It is they who set the pace and give the other men on the crew the "push." To get high tonnages with large crews, pride and initiative must be developed in all members of the crew. Large crews afford such an opportunity. A better competitive spirit can be developed among the members of a large crew than is possible in a small crew.

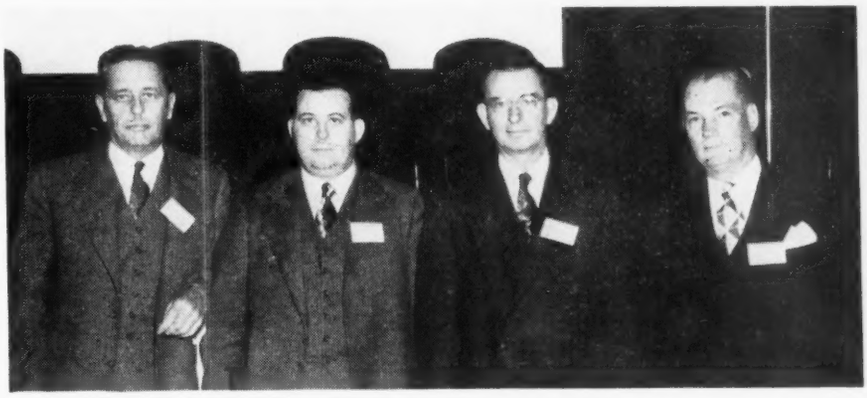
Conditions dictate the plan, said R. L. Adams, general superintendent, Old Ben Coal Corp., West Frankfort, Ill., in discussing Mr. McLellan's paper. Mr. Adams also described the set up at their New No. 9 mine operating in the Illinois No. 6 seam.

The coal industry must aim at 50 tons per face man to meet competition from other fuels, asserted Joseph F. Mazza, manager of maintenance, Rochester & Pittsburgh Coal Co., Indiana, Pa., in a paper on "Mobile Mechanical Loading Using Small Crews." Efficient mechanization should include the use of small crews and good service for them, such as delivering supplies to the face between shifts and providing enough empties at the loading point. Inspection of equipment and preventive maintenance are essential in keeping outages to a minimum.

With small crews, said Mr. Mazza, it is easier to train each man in the crew to be more versatile, versatility improving the efficiency and safety of the crews. High productivity is achieved through the combined efforts of men and machines, for today's machine is only as efficient as the man who operates it. Small crews, he said, can eliminate one trouble with mechanical mining — the over-manning with bosses. Some of the advantages cited for the small crew are: (1) maintenance of a more constant tonnage; (2) increased efficiency; (3) acceptance and enjoyment of individual responsibility by the men; (4) more tons per man; and (5) lower cost per ton. To illustrate, Mr. Mazza described an operation working a 48-in. seam using a combination of mobile loaders, shuttle cars, belts and track haulage. This operation, with 344 men, produced 4,551 tons of raw coal per day.



Mechanical-loading session—L. C. Campbell (left), Eastern Gas & Fuel Associates, chairman; C. E. Hough, American Rolling Mill Co.; John Pschirrer, Pschirrer & Sons Coal Co.; Joseph F. Mazza, Rochester & Pittsburgh Coal Co.; and Frank G. Smith, Sunday Creek Coal Co., floor committee.



Gathering-haulage session—P. H. Haskell (left), Alabama By-Products Corp., chairman; J. D. Reilly, Hanna Coal Co.; D. R. Mitchell, Pennsylvania State College; and A. K. Hert, Snow Hill Coal Corp., floor committee.

The underground haulage session May 14 included papers on shafts and slopes, supply haulage in trackless mining and the handling of supplies and repairs in shaft mines and was conducted by J. L. Hamilton, general manager, Republic Steel Corp., Uniontown, Pa.

The choice between shafts and slopes has always been based upon the cost and convenience of utilization and the cost of sinking and equipping, said C. C. Conway, electrical engineer, Consolidated Coal Co., Herrin, Ill., in his paper on the "Economic Limit of Shafts and Slopes." Comparing the costs for sinking the two types of openings, the shaft might be cheaper, even with two compartments as against only one for the slope. However, the elimination of hoisting equipment and attendants, over the years, would probably offset the difference in cost. For example, the saving of only three shifts of labor per hoisting day at a 3,000-ton mine would net a saving of approximately $0.01 per ton hoisted and, throughout the life of the mine, might total several hundred thousand dollars.

A slope is not especially advantageous unless a belt conveyor is desired. The advantages, however, of an even flow of coal into the preparation plant, reduced manpower requirements for moving coal from the underground bin to the surface, and high-efficiency hoisting with low kilowatt-hour consumption per ton are factors that favor the belt conveyor as a slope hoist. Until recently, the belt conveyor had one serious disadvantage in that the maximum lift, on the average 15- to 18-deg. slope, was about 250 ft. Where the vertical depth was greater than 250 ft. an extra belt or belts were necessary. Manufacturers report that through new materials and modern manufac-

turing methods, belts are obtainable for lifts of 1,000 to 1,500 ft.

Mr. Conway observed that while sinking one slope at 17½ deg. and another at 15 deg., the work of men and machinery was sufficiently better on the flatter angle to justify the additional slope distance. This observation has been confirmed by members of the Sahara Coal Co.'s staff, who have completed eight slopes near Harrisburg, Ill., with vertical depths of 60 to 300 ft., and with some experimenting on the slope angle.

Supply haulage is the problem of transporting material into and about the mine and distributing it with a minimum of interference with the flow of coal, stated Robert Fletcher, consulting engineer, J. H. Fletcher & Co., Chicago, Ill., in a paper on "Supply Haulage in Trackless Mining." Operations using trackless gathering and main-line track haulage usually have to rehandle materials at the roomneck or some central point from which the supplies are distributed by a reversal of the gathering equipment. In a complete belt-conveyor system, said Mr. Fletcher, when the belts are reversed to handle supplies on the off shift, there is a danger of damaging the belts.

Shaking-conveyor systems distribute supplies from the roomneck to the working face by dolly cars pushed along inside the pan line by hand or use the "dead-pan" or "false-pan-line" method, where the machine winch is used to snake along the line of pans filled with supplies. Where off-shift supply handling takes place on panel- or butt-entry conveyors, the belts are reversed and are run at half speed. Idlers cut to train the belt now react to draw the belt out of line. This often results in edge wear on the return run, where the most damage to the side of the belt occurs. In the case of long belts, the tendency is to establish a supply route so that men and material can move independently of the flow of coal. Some mines parallel the belt line with light-rail track. Others run mobile supply trucks over well-kept haulageways.

Tractor-Trailer for Supplies

Pneumatic-tired supply-hauling equipment is battery powered and either of the truck or trailer type. In high coal, the truck model can be used. In low coal, a tractor drawing several trailers works very well. With this method, a single supply man can transport a full bulk load from the outside of the mine to the face. Rehandling at the belt-rail junction is eliminated because the bulk load is handled as a unit. A number of trailers may be coupled to a tractor and drawn the length of the belt line. Upon reaching a territory, a trailer may be dropped and left for the section supply man to pick up and distribute, while the balance of the trailer train goes on without delay.

Where supplies are to be moved by pneumatic-tired equipment, said Mr. Fletcher, the success of the operation is proportional to the maintenance of the roadbed. Drawbar pull is dependent on tractive effort between the drive wheels and the road. Therefore, the better the roads the higher the tractive effort and the more load the tractor can pull.



Underground-haulage session—J. L. Hamilton (left), Republic Steel Corp., chairman; C. C. Conway, Consolidated Coal Co.; Robert Fletcher, J. H. Fletcher & Co.; H. A. Quenon, Eastern Gas & Fuel Associates; and A. W. Hesse, Buckeye Coal Co.

The difficulties of handling supplies in shaft mines are much more pronounced than in drift mines, H. A. Quenon, general superintendent for Eastern Gas & Fuel Associates, Grant Town, W. Va., pointed out in a paper on "Handling Supplies and Repairs in Shaft Mines." Citing actual figures, he said that a 9,000-ton operation using 40 cars of supplies a day required 247 man-hours daily to handle supplies to their destination. The main hoisting shaft, where coal is hoisted three shifts, is tied up two hours each day (6 to 8 p.m.) for the caging of supplies too bulky to go down the man shaft. In addition, 32 man-hours lost by the tipple crew must be paid.

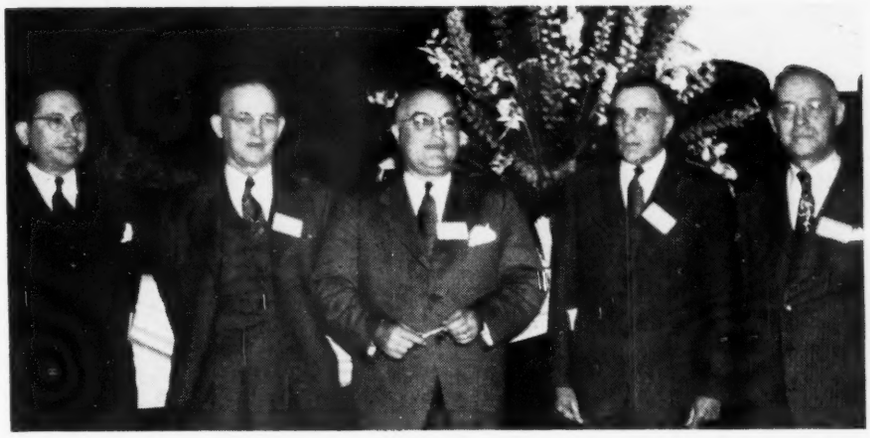
A breakdown of the 247 daily man-hours required for handling the supplies is as follows: (1) handling supplies at man-cage, 56 man-hours; (2) outside motor crew, 16; (3) timber checker, 8; (4) sand dryer, 10; (5) rehandling posts, 32; (6) caging and taking supplies to mine tracks (coal hoist), 64; (7) supply distribution crews, 54; (8) handling mine machinery to outside shop, 7 man-hours.

To facilitate the handling of supplies in the future, this operation has prepared plans, in conjunction with a ventilation project, and has commenced work on a shaft and outside and inside storage tracks near the center of the mine property. The shaft compartment, already completed, is 14x23½ ft. and will be equipped with an 8x23-ft. cage that will accommodate such equipment as loading machines, shuttle cars, mine locomotives and cutting machines (less the bars in some cases) without having to dismantle them. Timber-supply tracks will be assigned to individual sections of the mine and will accommodate several weeks supply. A suppliers' storage yard a short distance from the mine tracks will be provided for the suppliers who expressed a desire for it. They will be responsible for the materials until they have been loaded into the mine cars.

Sand is to be dried and delivered to the mine through a borehole. A diesel locomotive will do the outside switching. It is estimated that with the new setup only 135 daily man-hours will be needed to handle and distribute the supplies, or 112 man-hours less than required at present. The inside motor crew, under the new plan, will spend a large portion of its time working with the outside crew. There are to be no specialists and each man will be required to perform work as directed by the foreman.

Large mine cars, shuttle-car gathering and pre-fabricated track were discussed at the session on gathering haulage May 15 conducted by P. H. Haskell, vice president, Alabama By-Products Corp., Birmingham, Ala. Large mine cars will of themselves, other things being equal, increase productivity of the loading machine in direct relation to the number of car changes they eliminate, said J. D. Reilly, general manager of underground mines, Hanna Coal Co., St. Clairsville, Ohio. Mining conditions and the physical ability to handle the cars are factors that should determine the size of the car, he said, in discussing the "Effect of Mine-Car Capacity on Mechanical-Loading Efficiency."

Large mine cars have not been allowed to prove their full worth because much of the special effort which went into getting high tonnages with small cars has been dropped after going to a larger car. Proper shooting and better face preparation are essential for good loadability. Loading machines, Mr. Reilly said, are loaders—not diggers. To show that special effort still is needed, he cited an operation which, ten years ago, was averaging 485 tons per loading



Face-preparation session—George R. Higinbotham (left), Consolidation Coal Co. (W. Va.); Ralph G. Perry, Sahara Coal Co.; J. J. Foster, Island Creek Coal Co., chairman; Davis Read, West Kentucky Coal Co., floor committee; and Harry S. Gay, Gay Coal & Coke Co.

machine with 3-ton cars. Today, the same operation has 10-ton cars and still is averaging only 485 tons per loading-machine shift. By providing the proper track layout and good face preparation, Mr. Reilly believes loading machines should get 700 to 800 tons per shift.

The safety feature and the use of large cars to serve conveyors were other advantages mentioned by P. R. Paulick, Hellier Coal & Coke Co., Pikeville, Ky., in discussing Mr. Reilly's paper. Big cars must have better track and it all adds up to safer transportation. Comparing costs between belt and rail haulage, Mr. Paulick said that up to one mile belts have the advantage. But at two miles, track haulage is 8c per ton cheaper.

Time studies are useful in determining the characteristics of a particular method of doing work and for determining deficiencies in production cycles, said David R. Mitchell, head, department of Mineral Engineering, and Richard L. Ash, research assistant in mining, Pennsylvania State College, in a paper on "Time Studies to Improve Shuttle Gathering." Improvements can be expected if the following things are done: (1) Improve the coordination between the main-line and section transportation systems by better design and supervision. Too much time is being lost in waiting for empties or by belt stoppages. (2) Increase the size of the mine car to the maximum permitted by the size of the mine openings. (3) Use as large a shuttle car as the passageways will accommodate. (4) Take advantage of the operating characteristics of the shuttle car and minimize the effect of its limitations. Shuttle car sections should have a minimum of right angle turns, standby positions close to the loading machine, short hauling distances and non-conflicting travel routes. (5) Improve maintenance procedures by adopting routine machine and roadway inspections and overhauls, with an adequate supply of spare parts strategically located. (6) Improve face preparation so that loading machines can operate more nearly at rated capacity. And (7) train men in good operational and maintenance practices, with special emphasis on supervisors in production-cycle coordination.

The decision to use prefabricated track (*Coal Age*, December, 1946) was a logical outgrowth of the desire to get away from a haulage bottleneck and inefficient car changes in servicing the loader, said Sterling S. Lanier III, assistant superintendent, Norton Coal Corp., Nortonville, Ky. His paper, "Prefabricated Track for Mobile Loading," was read by J. R. Taylor, general superintendent.

With prefabricated track, there is little time lost that can be charged to derailments or other track troubles. For the year 1946, lost time from derailments of cars averaged 6.6 minutes per machine shift or 20 minutes for the three Goodman 460 loader per day. Three and one-half trackmen are required to lay track for each loader. The crew averages laying 18 places per shift, including switches. Two men lay a complete turnout in 2½ hours. The tonnage per trackman in 1946 was 164.3 tons per shift, including the recovery crew. This represents a saving in track labor of approximately 50 percent as compared to the old "cut, bend and try" method. Concentration of the work permits four key-room sets of track, plus track for development work, to provide enough places for one loader. The total cost of track needed to work out one panel is approximately $12,000 for room track and about $3,000 for entry track.

The advantages of prefabricated track were summed up as follows: (1) provides fast reliable haulage roads, making possible quick car change to high-capacity loading machines with large mine cars; (2) track can be reclaimed from a worked-out key room and moved to the next place without alteration; (3) approximately 50-percent saving in time and labor in laying track; (4) saving in time lost from derailments and other troubles caused by defective track; (5) safer for men and easier on rolling stock; (6) insures systematic operation.

Prefabricated panel track has been adapted to use in a four-entry panel layout, said John G. Donan, engineer, Jones & Donan, civil and mining engineers, Madisonville, Ky., in discussing Mr. Lanier's paper. It is an improvement over the two-entry-panel layout and permits two loaders to operate in one panel without interference. In this layout, the main-line parting is established within the panel. Running the main-line locomotive into the panel eliminates the need for the relay locomotive and gathering haulage is restricted to the key room being loaded. One gathering locomotive services the loader, while at present sometimes two locomotives are used.

Standardization and preplanning of a prefabricated layout, said Mr. Donan, eliminates the detailed supervision by the foreman and reduces tracklaying to a few simple routine tasks which can be performed by unskilled labor. Proper attention should be given to the use of extension rails at the face, so that the cutting machine can produce a maximum depth of undercut. Each inch lost from the maximum depth of cut by the cutter bar reduces the tonnage cut by 1 percent.

Cut Bugdusted Automatically

Three-fourths of the cuttings, it is estimated, are brought out of the kerf by the screw-type bugdusters used on shortwall cutting machines in the Sahara mines, declared Ralph G. Perry, chief engineer, Sahara Coal Co., Harrisburg, Ill., at the May 15 session. He illustrated his paper with slides that included photographs of the conveyor-type dusters tried originally in their mines but which were unwieldly and did not solve the dust problem.

Mr. Perry listed five advantages of the type of bugdusters now in use: (1) leaves a kerf practically free of cuttings; (2) saves the labor of shoveling cuttings away from the machine; (3) eliminates practically all the dust from at least one operation in face preparation; (4) is safer because illumination is better as a result of less dust; and (5) the workmen say it is the best piece of machinery ever put in the mine. The bugdusters are on cutters with 8- and 9-ft. bars making a 6-in. kerf, operating with a feed of 32 in. per minute and making cuttings at the rate of 24 tons per hour.

Tests showing that 78 to 82 percent of the total cuttings produced are brought out of the undercut by the bugdusters were cited by C. R. Bourland, assistant to the vice president, New River Co., Mt. Hope, W. Va., in discussing the paper. His company has 11 screw-type bugdusters in use, some for as long as nine

months without appreciable trouble or maintenance. The cutting is easy. The machines are used in conveyor mining and cut only about 150 ft. per shift. They are 50-hp. units with 7½-ft. bars and work in the Sewell low-volatile seam.

He finds results better than by hand bugdusting. What cuttings are left in the kerf are toward the front and thus have little adverse effect. Freedom from dust has brought favorable reactions. Three criticisms were mentioned, however: (1) greater length of the machine means timbers farther from the face; (2) greater length means more clearance required between end of conveyor and face, and (3) application of the bugduster leaves no place at rear of cutter for attaching a lifting jack.

Ten to 12 percent more production per unit after installing four Goodman No. 512 machines with bugdusters was reported by J. E. Davis, general manager, Guyan Eagle Coal Co., Amherstdale, W. Va. The machines with bugdusters are paying for themselves in a year and six more are on order. New machines with bars 8½ ft. long take no more power than old machines with 7½-ft. bars without bugdusters. Mr. Davis suggested that the screw-type dusters be equipped with some type of gate at the end of the tube to trap dust during sumping-in. Answering a question from the floor, he said water is not being used on the cutter bars.

Use of factory-built rubber-mounted cutting-and-shearing machines capable of cutting 900 tons per shift, thus insuring plenty of face preparation ahead for loading machines averaging 600 tons per shift in trackless shuttle-car mining, was described in a paper by G. R. Higinbotham, vice president (operations), Consolidated Coal Co. (W. Va.), read by G. W. McCaa, superintendent, Consolidation No. 63 Mine, Monongah, W. Va.

Cutters for Trackless Mining

The machines are 30 ft. 9 in. long, 83 in. wide, 41 in. high, have the same wheel gage as the shuttle cars and can operate in a 41-in. seam if no cross-headers are required. The mining is by high concentration in the Pittsburgh seam. Six-inch kerf, shear and top cuts are made and water is used on the cutter bars. In the 18 months the new machines have been in use, experience on the fireclay bottom, where softened by water, has indicated a need for crawler or half-track mounting.

Among the advantages Mr. Higinbotham credited to the machines were: (1) universal cutting ability, (2) fast cutting rate, (3) flexibility of use in raising timbers, cutting rib holes and so on, (4) fast tramming, (5) greater safety because men are farther from the face, (6) accessibility of parts for making repairs in the working section and (7) hydraulic steering mechanism. Maintenance, he said, has been too high and this he charged to the necessity of slewing the machine sidewise to cut a square face, thus putting a severe strain on the cutter bar and head. A clearance of but 6 in. under the front axle is too little. Tons per renewal of cutter chains has been 65,000 and per cutter bar 80,000.

In the discussion, Fred A. Miller, chief engineer, Consolidated Coal Co., St. Louis, said his company uses rubber-mounted cutting machines to excellent advantage for numerous jobs besides their primary function of cutting for mobile loading machines serviced by shuttle cars. Their experience with rubber-mounted cutters has been essentially the same as that reported by Mr. Higinbotham. Mining is in the Illinois No. 6 seam and 8 to 10 in. of bottom coal is left to keep the cutter and shuttle cars from bogging down in the bottom, which is softened by some water.

Use of rubber-tired self-propelling cable-reel coal drills preparing coal for loading machines that average 750 tons per shift and reach peaks of 950 tons was described in a slide-illustrated paper by C. M. Shott, vice president, Sheridan-Wyoming Coal Co., Inc., Monarch, Wyo., read by George B. Jackson, general superintendent, Independent Coal & Coke Co., Kenilworth, Utah. Monarch mine was modernized by the introduction of mechanical loading with trackless equipment in 1940, including rubber-mounted coal drills. The drilling is for Cardox tubes. The lower 9 to 12 ft. of a seam running up to 28 ft. in thickness is mined. The drilling performance is up to 160 holes per shift per drill.

Mine timbering machines were the subject of a paper by Harry S. Gay, vice president and general manager, Gay Coal & Coke Co. and Gay Mining Co., Mt. Gay and Gilbert, W. Va., dealing principally with the machines presented in the article on timbering methods of the Gay Mining Co., which appeared in the April, 1947, issue of *Coal Age*. The first machine, built in 1942, incorporated hydraulic-boom and circular-saw ideas advanced by Mr. Gay.

At the Gay Mining Co., the timbering machine transports Cardox tubes as well as timbers. Time studies made recently show that three men working with the timber-setting machine complete a place in 13.7 minutes, compared to 37½ minutes for the same work by a five-man crew without the machine, a saving of 24 minutes. During the few days that the timbering machine has been out of service for repairs in its four years of service, as much as 100 tons less coal per shift was produced by the loading machine.

Coal-Stripping Progress

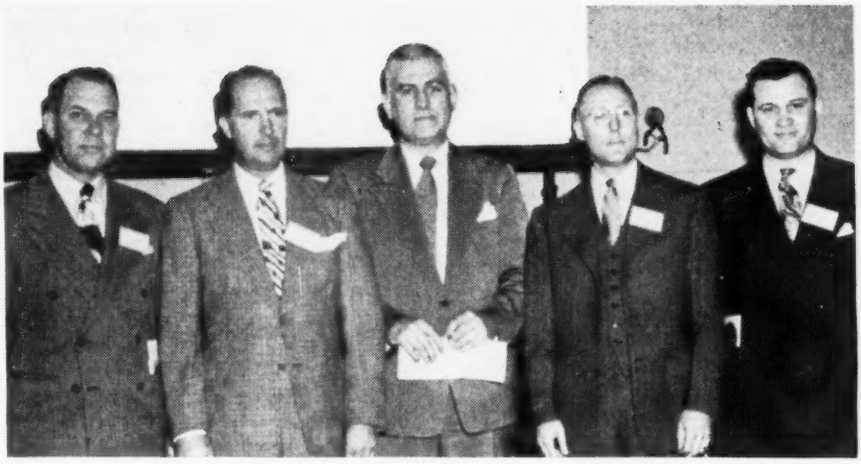
A call for manufacturers of strip-mining equipment to begin planning now for machines to mine long-range stripping developments was sounded by J. W. Woomer, mining engineer, J. W. Woomer & Associates, who delivered the opening address at the strip-mining session May 13, with Harrison Eiteljorg, general manager, Morgan Coal Co., presiding.

Reviewing the growth of bituminous stripping in wartime, Mr. Woomer predicted that long-range surface mining will see the recovery of coal lying under overburden 75 ft. deep and more. Though short-range strippers have solved some engineering problems with ingenuity, such operators may be expected to withdraw within three or four years, leaving the field to long-range operations which thus far have contributed the larger share of engineering advances.

Advances in recent years have included the following: high-tensile alloys in machinery and equipment, longer booms and higher-capacity dippers and buckets, new explosives and drilling equipment, larger haulage units up to 80 tons, portable substations and high-class engineering planning. Fields for future development, Mr. Woomer said, are the following: specifications for shovel and dipper size, tire and truck design, use of conveyors, development of short-range workings into long-range operations, engineering economics, cost studies, maintenance, height of banks, exploitation of reclaimed land, the merits of draglines vs. shovels and improved methods of drilling, blasting and haulage. Belt and rail haulage is likely to grow in the future to compensate for some of the present deficiencies in truck design and engineering, he concluded.

Further advances in electrical equipment were promised by David Stoetzel, mining engineer, the General Electric Co., whose comments on Mr. Woomer's address were read by C. B. Elledge, of the same organization. The needs of strip mining already have been responsible for the fact that many motors now used in stripping produce twice the horsepower stated on the name-plate. With this step-up in power, he stated, little if any increase in size has been made. Mr. Stoetzel warned, however, that electrical equipment is only as efficient as its component parts and urged that adequate attention be given substations, cables, insulation, maintenance and grounding.

Improvements in drilling and shooting have been partially responsible for increased depths and ratios in anthracite stripping in recent years, said G. A. Schnee, division engineer, the Philadelphia & Reading Coal & Iron Co. Skilled supervision is necessary for efficient overburden prepara-



First strip-mining session—Cecil Guthrie (left), Hume-Sinclair Coal Co., floor committee; Harrison Eiteljorg, Morgan Coal Co., chairman; J. W. Woomer, J. W. Woomer & Associates; G. A. Schnee, Philadelphia & Reading Coal & Iron Co.; and A. P. Massman, Sinclair Coal Co.

tion, which is reflected in lower costs for drilling and shooting and economies in repair and maintenance of equipment, Mr. Schnee declared.

"Improvements in drilling equipment, such as heavier drilling tools to permit faster penetration of the rock strata, operating platform with built-in tool wrenches to facilitate changing of bits, hydraulic jacks for quicker leveling of the machine at the hole, crawler mounting for faster moving and mechanical equipment for sharpening bits instead of the old hand method, tend to provide greater actual drilling time and more efficient drilling," the speaker said. Even so, he pointed out, constant study is being carried on in close collaboration with the technical staffs of powder companies and drill-rig manufacturers to improve drilling and shooting practices in the anthracite field.

Geological, legal and other problems encountered in drilling and shooting in bituminous stripping operations were discussed by Fred Horne, Sinclair Coal Co. In Mr. Horne's absence, A. P. Massmann, of the same company, presented Mr. Horne's paper. New-type, heavy-duty, high-speed drills are needed to stay ahead of modern stripping shovels and draglines, Mr. Horne declared, stating that the trend is toward larger boreholes to increase blasting efficiency and widen hole spacing. Though the efficiency of explosives has been improved in recent years, the problem of loading in wet holes still is a challenge to explosives engineers, he pointed out, and the density of explosive charges must be increased to prevent the floating of charges without lowering their efficiency.

Turning to claims for damages alleged to have been done to homes and buildings adjacent to strip mines by blasting vibrations, Mr. Horne said, "Such legal action is usually the result of a form of mass hysteria caused by . . . hearing the explosion and hearing windows rattle from airborne concussion. . . . The Bureau of Mines has compiled about 40 natural reasons why buildings crack, but the average property owner who suddenly begins to search for cracks never takes any of these natural reasons into consideration and, regardless of the age of any crack so found, he immediately determines that his property is being wrecked by blasting. It has been scientifically proved that any vibration which would cause a building to crack would have to create a displacement in the building of 0.050 in. . . . In a recent report prepared from a series of measurements in which the blasting was in close proximity to the buildings, the maximum displacement was 0.015 in." Mr. Horne suggested that stripping companies threatened with such legal action employ a reputable and disinterested engineering firm to survey the effects of blasting in the light of the Bureau of Mines findings.

Seven considerations that govern stripping in the anthracite region were outlined by J. Robert Bazley, president, J. Robert Bazley, Inc., the first speaker at the May 14 stripping session, with W. L. Burt, president, the Greenland Coal Corp., presiding. Mr. Bazley's seven considerations were: (1) thickness of seam; (2) pitch; (3) nature and volume of overburden; (4) area available for cast banks; (5) availability of railroads, service buildings, etc.; (6) efficiency of draglines and shovels in terms of pit depth; and (7) permanent physical improvements, such as railroads, towns, power lines, etc., that might impede stripping operations.

After a review of anthracite stripping practices since 1880, Mr. Bazley stated that today's practice in extensive crop strippings is to use draglines of from 5 to 25 cu.yd. capacity with booms 150 to 200 ft. long. When controlling factors forbid dragline operation, shovels are used with truck haulage. "The modern truck," said Mr. Bazley, "with its great all-round flexibility, ease of spotting under shovels, ability to climb general grades, its variable speeds, its dumping characteristics and its general ease of handling," has changed old methods. Whereas a spoil dump once required from 6 to 10 men, it now requires only a spotter and a part-time bulldozer, the speaker stated. Also, improvements in truck design to accommodate great impact have made it possible to use shovels with capacity up to 7 cu.yd.

Increasing stripping of combined crop and anticlinal or synclinal anthracite, especially at great depths up to 700 ft., puts severe limitations on the use of draglines, Mr. Bazley continued. Indeed, he pointed out, at depths of more than 50 to 60 percent of its boom length, the dragline becomes only a hoisting machine. Today's trend is toward a combination of excavating units including heavy-duty shovels, augmented by draglines, and modern truck haulage. In fact, he declared, it may be feasible to use conveyor belts under some conditions. In concluding, Mr. Bazley warned against the hazards to men and equipment when great areas of bottom rock on a steep pitch break loose and slide after exposure or erosion.

Commenting on Mr. Bazley's address, W. P. Petzold, mining engineer, the Hudson Coal Co., urged sound planning to achieve economy and long-range high production. Problems arising from the need of changing river beds and moving highways, railroads and buildings to uncover coal will become more acute, according to Mr. Petzold.

Pit Reopened With Dragline

Return of an old strip pit to production was described by Lafe Stewart, chief engineer, the Maumee Collieries Co. The operation was described by Mr. Stewart as follows:

On this property, abandoned more than 20 years ago because the overburden was too deep for excavating equipment then in use, a Bucyrus-Erie 1150-B walking dragline with a 25-cu.yd. bucket and a 180-ft. boom was put to work as a stripping unit. A section of the old pit was cleaned out and filled to the ground surface with spoil from the new cut. The 1150-B moved out on this level spoil and cleaned up the old pit ahead as far as it could reach. Then it moved back and completed the first section of the new cut down to the coal, dumping on the level spoil where it had just been standing. This was an insignificant amount of rehandling, confined to spoil which came into the new pit from the spoil deposited in the old pit. Repeating this process produced simultaneous cleaning of the old pit and development of the new pit. The whole operation, the speaker asserted, would have been much more difficult without the large dragline.

A new pit will be opened later to

the north of the present operation, Mr. Stewart said. Just now, the truck-haulage route from this new pit to the tipple is through the present pit, but because of maintenance problems and the expense of keeping a road through the old pit, a new road will be located along the highwall. The 1150-B, in addition to its regular stripping work, is developing a shallow bench on the highwall side as it completes its final cut and is placing well-shot shale and sandstone to prepare the new haulage road. This procedure is saving the expense of sending in equipment solely for road construction.

Mr. Stewart mentioned examples of dragline use for high efficiency and low cost as follows: (1) in areas where earlier mining makes it dangerous or inadvisable to work a shovel; (2) development of a bench for the shovel; (3) development of box cuts; (4) as a substitute for the shovel when the shovel is down for repairs or maintenance. Smaller walking draglines, he concluded, may be used for primary excavations in smaller operations and for drainage work.

Reviewing Mr. Stewart's address, R. E. Henderson, general superintendent, the Binkley Coal Co., pointed out that development of high-capacity draglines has led to the reconsideration of some coal lands that would have been passed over six years ago. These new draglines give reason for predicting that stripping will be economical at even greater depths than are now considered practicable. Mr. Henderson closed with the remark that conveyor belts deserve some thought by stripping operators as a substitute for dragline-and-truck work.

Adaptations of armor-plate steel, formerly used for tanks and gun mounts, to increase strength and wearing qualities and reduce weight were discussed by A. F. Busick, Jr., chief engineer, the Marion Power Shovel Co. Mr. Busick said his company explored the possibilities in new steels and alloys developed for the armed forces. Some of these new materials, after extensive testing and some modifications, have made possible the development of the two 40-cu.yd. shovel dippers now in use by the Hanna Coal Co. and the Tecumseh Coal Corp. Both dippers were placed in service as replacements on existing machines. Comparing data on the old dipper and the new one, Mr. Busick cited these figures:

	35 cu. yd. shovel (conventional steel)	40 cu. yd. shovel (modified armor-plate)
Weight, empty dipper	100%	90%
Weight, bail	100	62
Weight, dipper handle	100	70
Weight, material @ 3,000 lb. per cubic yard	100	114
Total weight	100%	95%

In addition to armor plate in the dipper, new-type steels also were used in the crowd, the stiff-leg handle and the stick, thus leading to a lattice-type boom construction that reduced the boom weight about 33 percent. Taking advantage of this reduced boom weight, the manufacturers extended the boom by 15 ft., with a net saving of about 23 percent over the weight of the old boom. All together, structural changes and new materials, plus a contour-shaped dipper shell-plate and additional dipper length, have produced an increase of 20 percent in daily yardage, Mr. Busick said. This development, he concluded, is only the first of many possibilities opened to equipment manufacturers by armor-plate steels.

Continued development of new equipment was predicted by Bob Dickey, Bucyrus-Erie Co., who commented on Mr. Busick's address. But high development costs and tedious research in metallurgical and mechanical engineering call for patience and cooperation from stripping operators, he pointed out.

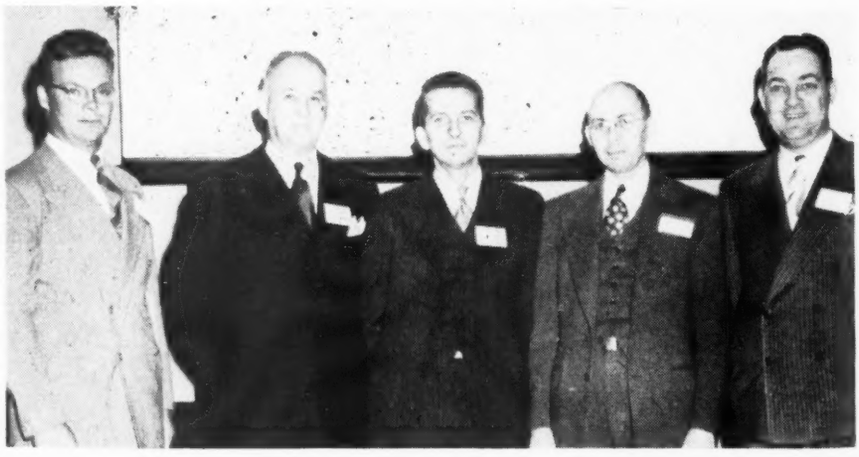
Land characteristics before and after stripping, coal-stripping regulations, public relations, forestation, forage crops, profits and land-use for multiple purposes such as hunting, fishing and recreation, were subjects of a six-man panel discussion at the May 15 stripping session. T. C. Cheasley, Sinclair Coal Co., was moderator. Participants, including Mr. Cheasley, represented the Land Use Committee of the National Coal Association. Many lantern slides, mostly in color, were used throughout the session to show methods of land use.

Conservation does not mean preservation or non-use, but making the most efficient use of resources over the longest possible time, declared Dr. A. G. Chapman, Chief, Division of Forest Management, Central States Forest Experiment Station, U. S. Forest Service, the first speaker. Citing the history of surface abuse by clearing of forests and misuse of soil by farmers since the time of the early settlers, Dr. Chapman stated that much of what is commonly called top soil is only soil on top, leached, infertile and deteriorated by long misuse. The problem is to get something else on top in its place—something that will put phosphorous, calcium and other needed minerals within reach of plant roots and will break up tight clay pans that block aeration and provide insufficient water. "It is easy to believe," Dr. Chapman contended, "that at some time in the future we will be practicing deep subsoiling or resorting to some kind of deep turning up or stripping to replenish the surface of our lands."

Coal-stripping regulations were discussed by R. T. Laing, secretary, Mineral Producers' Association of Pennsylvania. Many new pits, Mr. Laing declared, were opened under the stress of war needs, with little thought of geological conditions or future use of the land. These operations, many of them now abandoned, have aroused unfavorable public opinion and agitation for regulation of the stripping industry. Legitimate operators, concerned about this public clamor, said Mr. Laing, have formed associations to insure the survival of the stripping industry and to foster reclamation. Although some of these associations have been compelled to oppose such legislation when it was punitive and unjust, others have accepted legislation that was reasonable and just or have voluntarily assumed responsibility for reclamation.

"There is a very definite moral responsibility to posterity on the part of operators in the strip-mining industry," he declared. The great majority of lands disturbed by strip mining are sub-marginal, non-productive waste lands, yet the revenue from stripping them has paid off mortgages, paid back taxes and improved the land in general. This land can be given utility through a wise program of reclamation, voluntary or compulsory, and will result in a valuable heritage to posterity. "If the industry of its own free will does not take the responsibility of reclaiming and giving utility to the disturbed lands, then we cannot be too critical

Second strip-mining session—W. L. Burt (left), Greenland Coal Corp., chairman; J. Robert Bazley, J. Robert Bazley, Inc.; Lafe Stewart, Maumee Collieries Co.; A. F. Busick Jr., Marion Power Shovel Co.; and R. E. Henderson, Binkley Coal Co.





Land-use session—Orel E. John (left), Reclamation Development Co.; J. W. Bristow, Illinois Coal Strippers' Association; L. E. Sawyer, Indiana Coal Producers' Association; Dr. A. G. Chapman, Central States Forest Experiment Station; T. C. Cheasley, Sinclair Coal Co.; R. T. Laing, Mineral Producers' Association of Pennsylvania; Larry Cook, Ohio Reclamation Association; and Jay Littlepage, Greenland Coal Co.

of sane legislation," Mr. Laing concluded.

A discussion of public relations for stripping operators was offered by Larry Cook, executive director, Ohio Reclamation Association, who pointed out that the conflicts over stripping operations lie not in the industry's endeavors as an industry, but in its relationships with the communities in which it operates. The basic solution to this conflict, he stated, is that the land be put to the use it is best suited to. In addition, Mr. Cook urged specific steps to improve public relations as follows: (1) utilization and development of adjacent areas; (2) prevention of water contamination; (3) haulage roads left available as future access roads; (4) removal of eyesores and fire hazards upon abandonment; (5) participation in community organization; and (6) cultivation of farmers, sportsmen, women's clubs and business and professional groups. The last two steps, Mr. Cook warned, can be taken only after completion of the first four.

Selection of trees to suit soil and moisture conditions was urged by L. E. Sawyer, director of forestry and reclamation, Indiana Coal Producers' Association. Failure of many of the early plantings was due to ignorance or to neglect of soil and moisture requirements of various kinds of trees, he stated. Some of these early plantings failed because the trees were planted too far out of their natural range, others failed because the mineral acids, which differ from organic soil acids, virtually ate the roots off and still others failed because the soil was too alkaline.

These mistakes, however, have taught operators a great deal and extensive soil tests are now made prior to planting. Greatest success has been obtained with pines but a few hardwood plantings have survived. Experimental plantings on both leveled and unleveled spoil banks have proved without exception that survival and growth has been far greater on unleveled areas. A well-directed planting job based on information now available is not expensive, Mr. Sawyer contended. On the contrary, it is far more logical and economical than the misdirected job now being undertaken by some operators.

Since the job of combating punitive legislation is too big for any one operator, he urged mine owners to forget their differences and band together to revegetate mined-out areas with trees or grasses on sites where they will grow and to see that every mine owner participates in the program.

Forage crops and profits was the subject discussed by James W. Bristow, secretary-treasurer, Illinois Coal Strippers' Association. Two kinds of profits were promised by Mr. Bristow: (1) tangible profits, or money in the bank, and (2) intangible profits, including enhanced public good will and freedom from punitive legislation. In Illinois, he stated, best results are being obtained from the development of stock range on mined-out land, although it is important that an agronomist's advice be obtained before an area is converted to grazing.

Leveling or rearrangement of spoil piles, he warned, creates an impacted surface and fills intervening valleys that should be used for stock-water ponds. To supply primary nitrogen to depleted spoil banks, Illinois operators advise about 10 lb. of inoculated sweet clover seed to the acre. After two growing seasons, Mr. Bristow continued, the permanent pasture can be established by an additional 8 to 10 lb. of blue grass, brome, timothy, red clover, alsike, etc. Full maturity of the pasture develops at the end of the third growing season and the land can then be grazed. Preliminary and final seeding, when done by airplane, costs from $6.50 to $8.40 per acre. Net income on one 600-acre Illinois pasture has averaged $7 per acre since 1939, representing a return of about 36 percent annually on the cost of development and utilitization of the land.

Development of stripped lands for scenic beauty, fishing, hunting, trapping and recreation was urged by Orel E. John, reclamation engineer, Reclamation Development Co., Huntsville, Mo. Mr. John saw opportunities in land development for recreational facilities to absorb the growing leisure time of the American people. Most species of fish thrive in strip-pit lakes, he pointed out, and hunters and trappers are finding quail, ducks, geese, rabbits, beaver, muskrat, mink and foxes living on stripped-over lands. A little seeding to wild rice, row crops or sweet or grain sorghums will attract even more game, Mr. John declared. The list of organizations, such as Rotary Clubs, American Legion posts, women's clubs, the Farm Bureau, Boy and Girl Scout groups, who are seeking use of these areas, bears witness to the recreational resources of such lands and suggests the possibility of developing some of them as commercial recreational enterprises.

Richard Maize, Secretary of Mines, State of Pennsylvania, speaking in a discussion period following the panel, questioned members of the panel on the degree of participation by operators and on legislation controlling stripping. R. L. Ireland, president, the Hanna Coal Co., and chairman, Land Use Committee, National Coal Association, pointed out that the purpose of the committee is constructive, long-range action but that unwise legislative proposals have distracted the energies of the committee and retarded progress.

Preparation Refinements

Recovery of coal from mine refuse, laboratory control of washing plants and clarification of water in closed circuits were discussed in the surface preparation session May 12 conducted by Virgil C. Kibler, treasurer, Blackfoot Coal & Land Corp., Evansville, Ind.

Discussing the first topic, A. F. Castanoli, Robinson & Robinson, consulting engineers, Charleston, W. Va., described methods used in six different coal fields to recover substantial tonnages of coal that normally might find their way to the refuse pile. Three plants showed a recovery of 200 tons of good coal and 400 tons of steam coal, while three others showed a potential saving of 400 tons. Thus, an extra 1,000 tons was recovered out of a total production of 20,000 tons.

Washing the coal at a lower float-and-sink value and adding part of the middlings would increase coal recov-

ery, it was suggested from the floor. Thus, 2 tons of 15-percent-ash coal could be substituted for 1 ton of 30-percent.

The Truax-Traer Coal Co. considers the laboratory an essential part of its organization and insists on close cooperation between the laboratory, chemist, mine and preparation plant, said Jack M. Bishop, chemist for the company at Kayford, W. Va., in his paper on "Laboratory Control of Washing Plants." Approximately 30 minutes are required to obtain a quick ash determination but for a more accurate analysis 1½ to 2 hours are needed. He described how the samples were obtained and handled in the sampling laboratory (third floor of preparation plant) and also how they were released on a wire to the analytical laboratory on the ground for the approximate analysis, not more than 10 minutes after the taking of the sample at the end of the loading chute.

Laboratory checks, continued Mr. Bishop, help to detect and correct plant failures before damage is done and before an inferior product is produced and shipped to users.

Water-Clarification Practices

Size consist and density, or percent solids, tend to increase in a returned circulating water system when the quantity of water is increased, said S. M. Parmley, assistant chief engineer, Pittsburgh Coal Co., Library, Pa., in discussing "Clarification of Water and Closed Water Circuits." Increasing the density and viscosity of the polluted water causes: (1) larger and heavier particles to float; (2) less additional preciptate to be available for recovery and treatment; and (3) the ash content of the sludge to increase.

When raw coal and its associated impurities are immersed in water, even under quiet conditions, the water becomes polluted by liberation of the sludge-forming particles. In the past, settling cones, tanks or basins, acting as hydraulic classifiers, were used to remove the sludge. There, the velocity of the flow, an important factor, was reduced to a point where particles above a certain size settled by gravity.

Methods commonly employed to reduce the accumulation of solids in washery circulating water are: (1) running part of the washery water to waste; (2) prescreening to remove particles before the coal makes contact with the water; (3) pneumatic dedusting before washing to remove the fine particles; and (4) tapping part of the circulating water and removing the solids by settling, chemical treatment or by filtration. At the company's Champion plant, caustized starch (18 lb. per hour) and soda ash (5 lb. per hour) have been used as settling agents in an 85-ft. thickener with good results.

Following Mr. Parmley's paper, H. O. Zimmerman, chief engineer, Inland Steel Co., Wheelwright, Ky., described a new type of closed water circulating system to be used in their new 750-tons-per-hour cleaning plant for beneficiating coal from the Elk Horn No. 3 seam in Eastern Kentucky. A closed system was necessary to avoid violation of the stream-pollution laws of Kentucky and because of the scarcity of creek water.



Coal-preparation session—A. F. Castanoli (left), Robinson & Robinson; Jack M. Bishop, Truax-Traer Coal Co.; S. M. Parmley, Pittsburgh Coal Co.; and Virgil C. Kibler, Blackfoot Coal & Land Corp., chairman.

Water from the dewatering screens will be collected in a sump and pumped to a settling cone. Part of the overflow will be returned to the Baum-type washing jigs and the remainder will go to the Deister tables. The underflow from the cone will unite with the water and clean coal from the Deister tables and pass through a Bird filter for dewatering. All, or a part, of the effluent from the Bird filters, both the clean-coal and the refuse units, may be diverted to dirty- or clean-water sumps, depending on which method gives the least solids in the circulating water. The overflow from the dirty-water sump will pass to the clean-water sump.

The underflow from the dirty-water sump will be passed through a Bird polisher for further removal of solids. The polisher rotates faster than the filter. The solids from the polisher may either be sent to the refuse or united with clean coal. Another Bird polisher will be a standby unit for filtering the make-up water from the creek during rainy periods when the water is muddy and cannot be used directly.

Making Mining Safer

"Safety is the most important aspect of the coal industry before the public today," declared I. N. Bayless, president, Union Pacific Coal Co., who presided over the safety session May 12.

Safety in coal mining cannot be compared with safety in other industries because coal mining includes the risks of many other industries as well as many hazards of its own, according to C. G. Brehm, supervisor of safety and compensation, Susquehanna Collieries Co., the first speaker. After reviewing safety progress, Mr. Brehm claimed special credit for the coal industry for its improvement, in spite of older and sometimes incompetent workers who took the place of younger men in uniform, a longer work day and a longer work week. Yet, said the speaker, similar or even greater improvement was made in other industries during wartime.

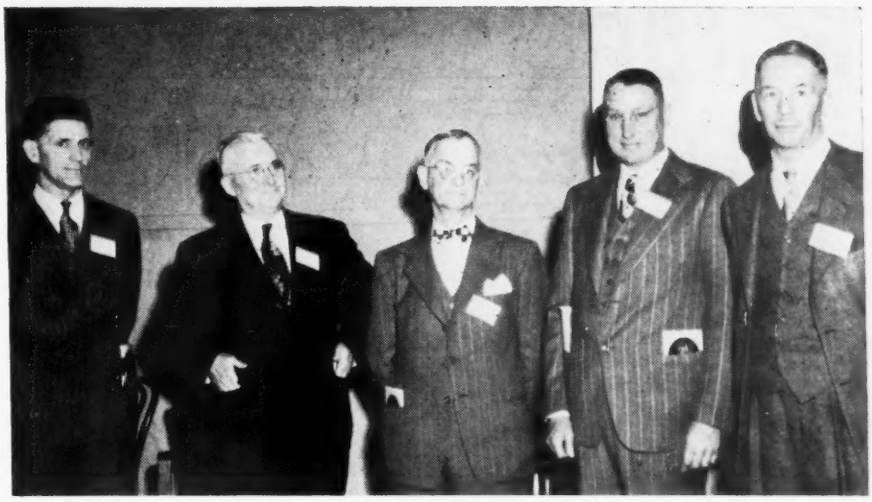
Mechanical mining, while it has reduced accidents due to falls of roof, haulage and explosives, "has probably contributed to accident occurrence from fires and explosions by adding new hazards," he declared. In concluding, Mr. Brehm pointed out two steps to greater safety in coal mining: (1) removal of physical hazards and (2) education of the workmen "in knowing how to do the job, remembering 'that no job is efficiently done unless it is done safely."

Coal-mine safety impinges upon the economics and welfare of the entire nation, said C. A. Peterson, assistant to the president, Northwestern Mining & Exchange Co., who discussed Mr. Brehm's address. Factors favoring a continuation of the present downward trend in the accident and fatality rate are: (1) machinery and safety appliances — manufacturers must keep safety uppermost in designing new machinery; (2) management—mine officials must be trained for safety and good labor relations; (3) employees—they must cooperate with management to lower accident and fatality rates. Mr. Peterson urged that appropriate agencies furnish reliable statistics on safety, capable of analysis and easy to understand, and that the coal industry study its

wartime production and safety record as a guide to future improvement.

Arthur Bradbury, safety engineer, Inland Steel Co., who continued the discussion, warned that coal's improving safety record must stimulate the industry to boost its standing still more. The principal hazards—falls of roof and coal—he pointed out, have not changed over the years and that is where the most work still needs to be done. The greatest advances have been made in the prevention of mine fires and explosions, and the Centralia disaster has given the greatest impetus in history to rock dusting.

Since the human element plays the largest part in mine safety, Mr. Bradbury declared, safety education is needed above all else. In the education of workers, he maintained, the ability and ethics of the immediate supervisors are of primary importance. Responsibility for safety lies on four groups, Mr. Bradbury concluded: (1) the operators, in furnishing safe equipment and mining plans; (2) foremen, in enforcing safety rules and educating workers; (3) mine workers, in complying with safety regulations; and (4) the union, in urging safe practices on members.



Safety session—P. M. Cassidy (left), Sloss-Sheffield Coal & Iron Co.; I. N. Bayless, Union Pacific Coal Co., chairman; Clyde G. Brehm, Susquehanna Collieries Co.; E. F. Maurer, Rail & River Coal Co.; and Glenn B. Southward, American Mining Congress, floor committee.

Mine-Fire Precautions

A five-point program of precautionary measures against mine fires was advocated by E. F. Maurer, general superintendent, Rail & River Coal Co. Mr. Maurer's program included the following: "(1) removal of combustible material from possible contact with energized power lines; (2) installation and maintenance of electrical equipment in such manner that electrical hazards will not result; (3) systematic inspection of wiring and bonding; (4) sectionalizing of power circuits; and (5) dust control and use of flame-proof insulation."

In fighting fires, the speaker said, the following are cardinal points: (1) prompt withdrawal of all employees from the mine, especially those who are endangered by smoke and asphyxiating gases; (2) use of all facilities at hand to combat the fire; and (3) action on a predetermined plan under which all foremen are acquainted with alarm signals and can readily remove their men to safety. It is imperative, Mr. Maurer continued, "that mines be planned and projected so that escapeways are provided on intake air and free from track and electrical conductors."

Drawing upon his own experience with mine fires, he urged that fire-fighting equipment at the mine include fog nozzles to permit approach within range of the fire for effective use of water and to prevent the danger of scalding and flash-back. As mining progresses, the seam should be constantly observed for moisture and friability. By far the largest percentage of all mine fires are of electrical origin, he pointed out, but preventives can be installed without excessive cost and without impeding production. Capable and well-trained men must be available for fighting fires, Mr. Maurer concluded, and the training of transportation men is especially important.

A list of six "musts" in fire precautions was offered by C. J. Evans, safety director, the Powhatan Mining Co., who led off the discussion. These "musts" include: (1) a predetermined plan; (2) men trained in the use and maintenance of electrical equipment; (3) separate escapement ways, free of wire and other hazards and supplied with fresh air; (4) fire doors on main intake, capable of being controlled from a central station; (5) a supply of high-pressure water; and (6) a fire-fighting truck. "We think we know it all until a fire breaks out," Mr. Evans declared, "but when it comes, our inadequacy is surprising." Concluding his remarks, Mr. Evans urged that the Bureau of Mines undertake further development of mine-fire fighting and preventive equipment.

Continuing the comments on Mr. Maurer's address, R. H. Nicholas, director of safety, the Pittsburgh Coal Co., pointed out that most mine fires begin on the main haulage road and that therefore the main haulageway must be planned for safety from the time the mine is first opened. Though circuit breakers are an important safety device, they are not the whole answer because many of the short circuits that cause fires will not kick the circuit breaker. Broken bonds and inadequately bonded track are a common source of fires, together with an inadequate return system.

Mr. Nicholas called for special care for trailing cables, which are not fireproof but only fire-resistant. To guard against fires caused by coiled cables, the Pittsburgh Coal Co. keeps a bag of rock dust suspended above the coil, so that any fire generated will burn the bag and dump rock dust on the fire. Other fire-prevention and control methods, Mr. Nicholas stated, are the following: (1) regular inspection of the mine and immediate correction of hazards; (2) ready availability of fire-fighting materials for quick action; and (3) a small map of his section in the hands of each foreman and assistant foreman, with airflow direction indicated and escapeways clearly marked.

Combining safety with speed in underground transportation — sometimes as fast as 20 m.p.h.—has set up a new problem for the coal industry since the advent of portal-to-portal pay, said P. M. Cassidy, safety inspector, the Sloss-Sheffield Steel & Iron Co. Describing in detail man-trip equipment in several shaft, drift and slope mines, and illustrating it with lantern slides, Mr. Cassidy declared that many operators already are solving this problem.

The ideal arrangement, Mr. Cassidy said, "is to have the men load into the man-trip cars on the surface and transport them directly to their working places without delay, without transferring from one trip to another and with a minimum amount of walking. . . . With the urgency of the problem and the facilities that daily are becoming available, answers will be found to fit nearly every condition," he concluded.

Time and discipline involved in portal-to-portal work are best taken care of by the mine foremen, said H. C. Livingston, vice president for operations, Union Pacific Coal Co., in commenting on Mr. Cassidy's address. At the Union Pacific mines, foremen are scattered throughout the man-trip to enforce discipline and to see that all men wear safety goggles, lights and other equipment from portal to portal, Mr. Livingston pointed out. Other safety precautions at the Union Pacific mines include the following: dynamic braking on the man-trip, a stand-by hoisting engineer on duty for all man-trips, a light system to supplement the regular bell signal system and a safety rope running through each car of the man-trip.

EQUIPMENT PROGRESS
Highlighted at Cleveland Exposition

A TOTAL of 188 organizations—the highest in history—displayed equipment, materials and services for the advancement of coal mining at Cleveland May 12-15, under the auspices of the Manufacturers' Division of the American Mining Congress, with P. D. McMurrer, assistant to the secretary, A. M. C., in charge of arrangements.

J. J. Huether, General Electric Co., was chosen chairman of the Manufacturers' Division, succeeding Thomas McNally, McNally-Pittsburg Mfg. Corp. John T. Ryan Jr., Mine Safety Appliances Co., was elected third vice chairman, completing the roster with J. H. Fulford, Jeffrey Mfg. Co., and M. L. McCormack, Ingersoll-Rand Co.

Exhibitors and their products and services were as follows:

American Steel & Wire Co., Cyclone Fence Division (subsidiary United States Steel Corp.), Cleveland, Ohio — New Cyclone all-metal conveyor belting.

Austin Powder Co., Cleveland, Ohio —"Coalmaster" coal drills, heads and bits.

Barber-Greene Co., Aurora, Ill.—Barber-Greene mine conveyors.

Bowdil Co., Canton, Ohio—New "Fabri-Forged" cutter chains, featuring true-running track guide, absence of weak links, easy maintenance and low operating cost; Bowdil concave cutter bits; Bowdil transfer switches and other mining products.

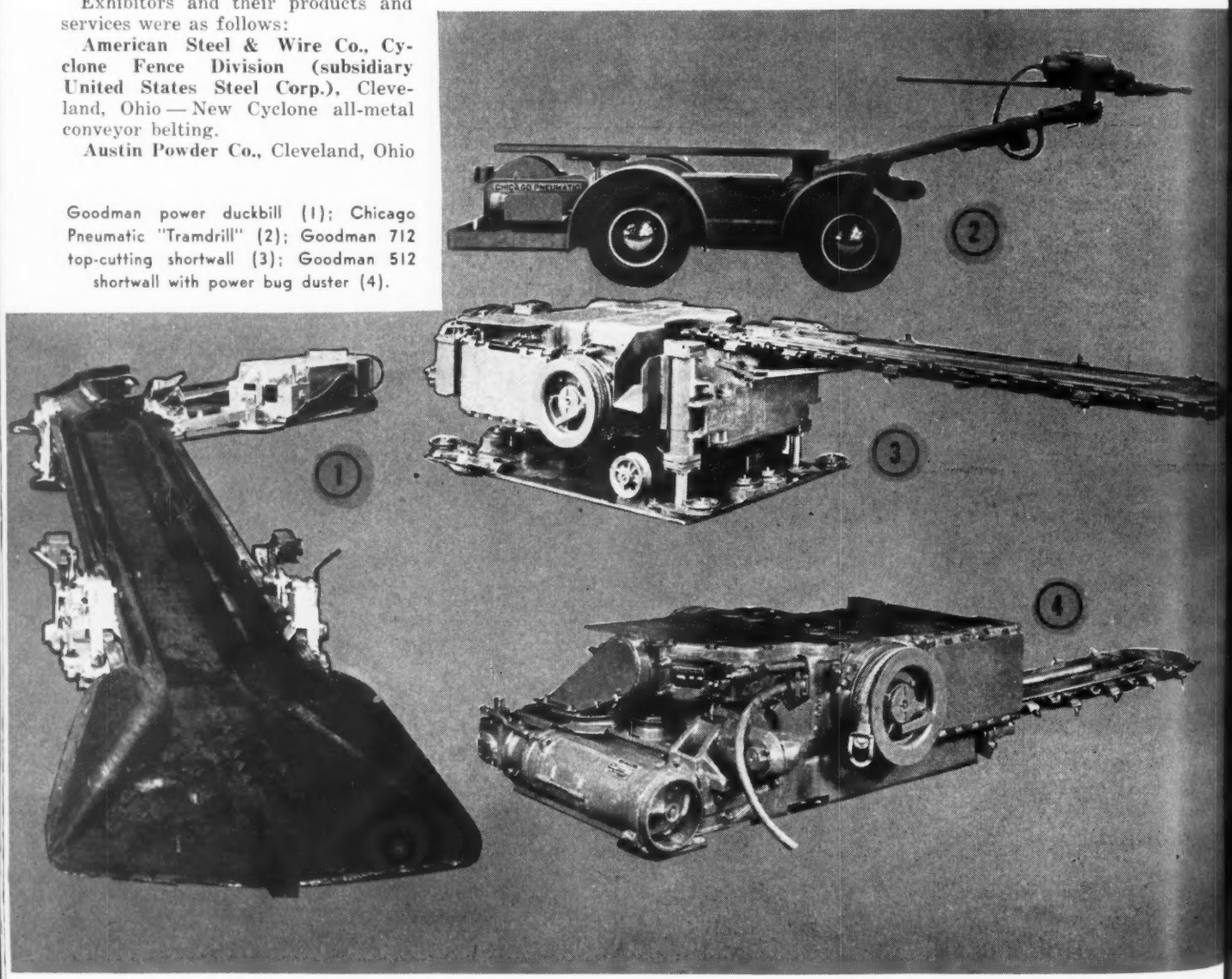
Brown-Fayro Co., Johnstown, Pa.—Model HP post pullers.

Bucyrus - Erie Co., South Milwaukee, Wis.—Pictorial display of stripping shovels and draglines, coal loaders, bulldozers, scrapers and blasthole drills.

Cardox Corp., Chicago—Cardox and Airdox coal-breaking mediums and Hardsocg drilling machines, augers, heads and bits for deep and strip mines.

Cesco Mfg. Co., Homestead, Pa.—Cesco "Super" mine-bit forging machine and furnace for resharpening bits. Designed for one-man operation, the machine is said to re-dress 3,000 to 4,200 bits in one seven-hour shift. Cesco alloy, alloy-tipped and tungsten-carbide-insert bits for both underground and strip mining also were shown.

Chicago Pneumatic Tool Co., New York—CP line of hand-held and post-mounted coal and rock drills, CP impact wrench and the new permissible CP-5800 Tramdrill (see illustration).



Goodman power duckbill (1); Chicago Pneumatic "Tramdrill" (2); Goodman 712 top-cutting shortwall (3); Goodman 512 shortwall with power bug duster (4).

The latter is described as a self-propelled rubber-tired completely electrically controlled coal drill. The electrically actuated boom is said to permit fast one-man positioning, with all drill-arm and boom controls located at the end of boom for convenient operation by driller. Standard boom length is 7 ft., with lengths up to 11 ft. available. The unit drills holes up to 4 in. in diameter. Height is 36½ in.

The new No. 5600 Tramdrill "Arm Unit" also shown consists of a No. 580 permissible 250-volt-d.c. Little Giant coal drill and a No. 572 permissible arm-actuating motor for positioning the arm for mounting as a unit on a crawler truck, mine car or other conveyance. Completely electrically operated, the unit requires no hydraulic controls, the company points out.

Cincinnati Mine Machinery Co., Cincinnati, Ohio—Duplex and Stanex cutter chains and bits; cutter-bar unit interchangeable on 7AU and 29U cutters.

Clarkson Mfg. Co., Nashville, Ill.—New 24BB Universal "Redbird" track-mounted loader designed to work in seams as low as 36 in. thick.

Duff-Norton Mfg. Co., Pittsburgh—Complete line of jacks for mine timbering, featuring pin-timbering jacks with forked base and various types of heads and handles (January, 1947, *Coal Age*, p. 64). The standard roof and timbering jacks are made in 8- and 16-ton capacities and include adjustable mine-roof jack fittings and square- and round-tubing constructions.

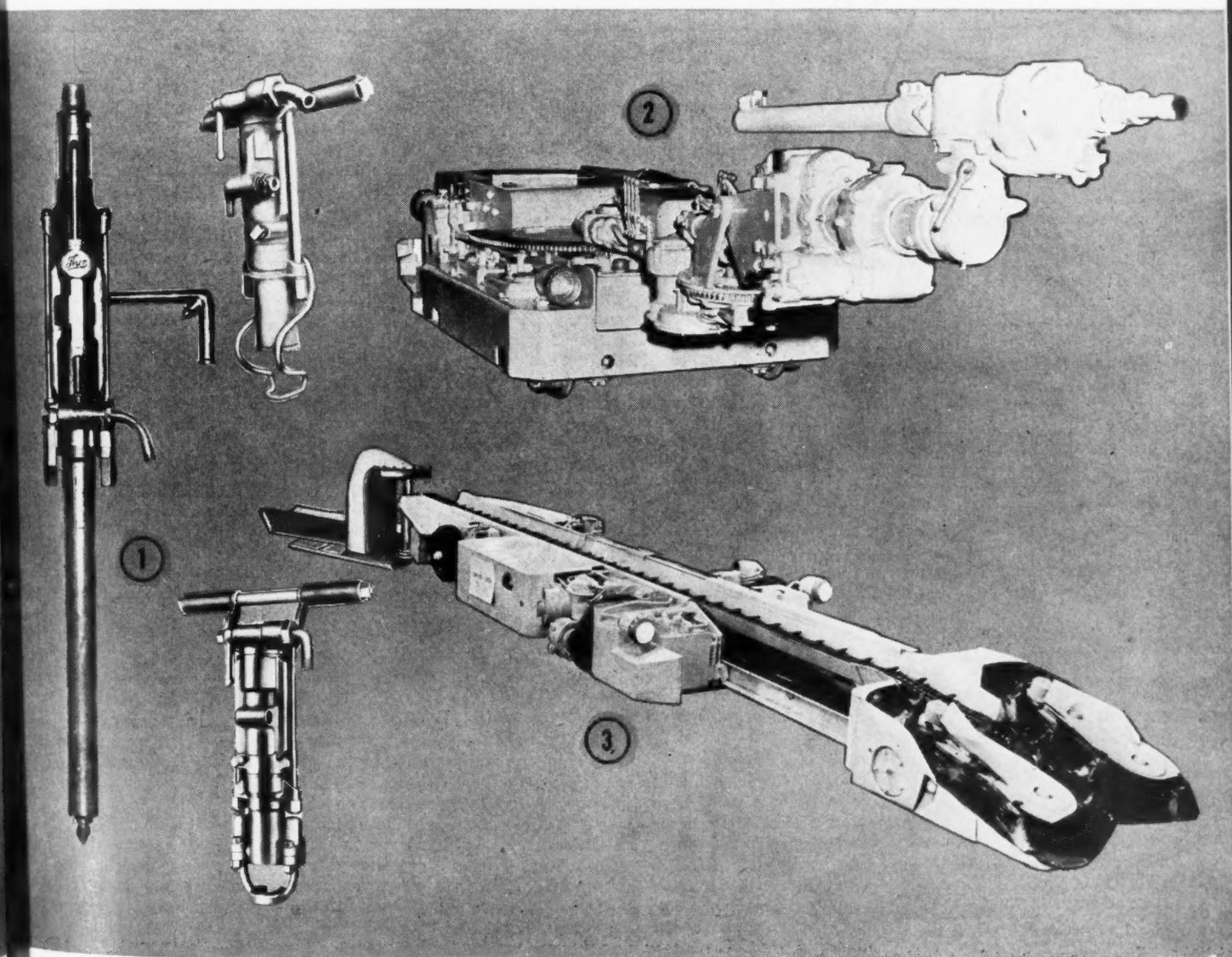
Gardner-Denver Co., Quincy, Ill.—Four sizes of dry sinker drills; four sizes of drifters featuring both hand-crank and automatic feeds; three sizes of concrete breakers; a tamper; two models of stoping drills; air hoist with safety brake; air-line oilers; air motors for fans, pumps and so on; 25-hp. water-cooled two-stage air compressor with built-in electric motor; mine-car loader, or mucker.

Goodman Mfg. Co., Chicago—Goodman 460-BH track-mounted loader and shaker drives, including the GS-15 side-drive unit.

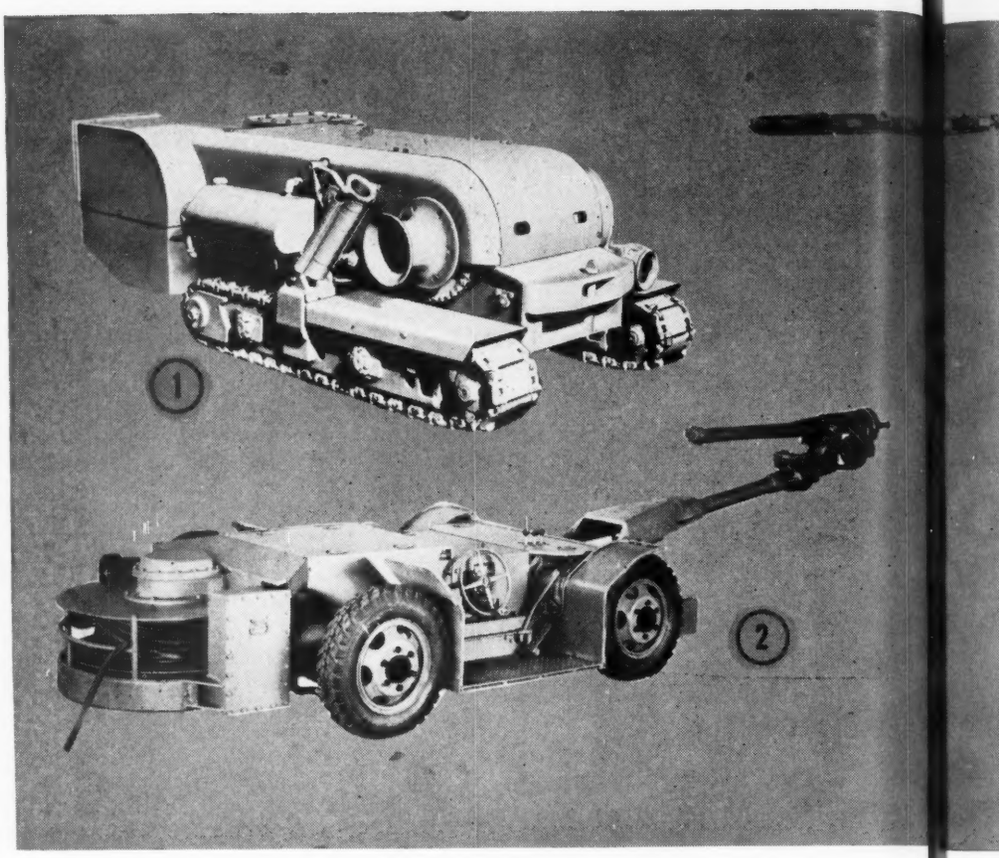
New with Goodman was the 277 high-type power duckbill (see illustration), companion unit to a new low-type machine. Described as an easily operated highly efficient loading machine, the power duckbill features power swing, power advance and retreat, great digging power (over 20,000-lb. thrust) and greater safety through keeping the operator back from the face.

New cutting equipment exhibited by Goodman included the Type EJH shortwall—a universal-type unit (see illustration). Features include hydraulic control on both feed drums and hydraulic tilting. It was accompanied by the new Goodman bugduster, which eliminates shoveling, reduces dust and piles the cuttings up so they are easily loaded, according to the company. The new Goodman 712-CJ top-cutting shortwall (see illustration) provides a wide range of top-cutting positions through hydraulic jacks. It also features hydraulic drums.

Harnischfeger Corp., Milwaukee, Wis.—Pictorial display of P. & H. electric and diesel shovels and draglines.



Thor pneumatic drills (1); Jeffrey 56-A mounted drill (2); Jeffrey 61-CLR conveyor loader (3).



Joy post puller (1); Sullivan CD-22 coal drill (2); Sullivan 11-RU rubber-tired cutting-and-shearing machine (3); Sullivan bug duster (4); Joy timber setter (5).

Independent Pneumatic Tool Co., Chicago, Ill.—New Thor Nos. 200, 400 and 600 stoper rock drills (see illustration). All three sizes are said to be light for their class, ranging from 75 to 116 lb., and to feature perfect balance, extra-long chucks, pattented lubricating systems and double-tube chuck-cleaning action that assures long, trouble-free service. Rifle bars are available for any rotational pitch necessary for drilling in the softest to hardest rock. Recently developed Thor Models Nos. 28 and 33 auger hand drills furnished for either wet or dry operation also were shown, along with Thor impact and sinker drills.

Jeffrey Mfg. Co., Columbus, Ohio—Jeffrey 43-L "Shortwaloader" and new loading, drilling and cutting equipment, including the 35-DX cutter.

The new 61-CLR conveyor-loader exhibited by Jeffrey (see illustration) is designed for operation in thinner coal with conveyor transportation. It is equipped with four rubber-tired wheels, all used in tramming. In operation, the rear end is anchored over the room conveyor and the rear wheels raised. It then moves from side to side on the two front wheels. The loading head can be run in and out as necessary in loading. Rated capacity, according to the company, is 1½ tons per minute. Hydraulically operated, the machine, it is stated, will clean up a 40-ft.-wide room and load crosscuts.

For drilling, Jeffrey offered the new 5-6A drill (see illustration) with full hydraulic operation, including auger positioning and rotation. It will accommodate one or two drills.

Joy Mfg. Co., Pittsburgh, Pa.—Joy loaders, including the 11BU and 14BU types, plus new units for cutting, loading, timber setting and so on; also Sullivan "Stripborers," air compressors and rock drills cadmium plated for resistance to corrosion and better running in.

A height of only 30 in. is a major feature cited for the new Sullivan 11-RU high-capacity rubber-tired cutting machine for trackless mining (see illustration). Able to cut horizontally 15 ft. on each side of the center line of the machine, the 11-RU features, according to the company, hydraulic steering and control, hydraulic drive motors and cable reel, 50-hp. cutting motor, dual control, greater safety, low maintenance, high maneuverability, high tramming speed, low center of gravity and variable sumping speed.

The new Sullivan bugduster (see illustration), providing a cleaner kerf, eliminating hand shoveling, providing non-clogging operation, placing bug dust for easy loading and operating without additional power was shown on a Sullivan 7-B heavy-duty shortwall.

For high-speed coal drilling in trackless mining, Joy offered the new Sulivan CD-22 rubber-tired coal drill (see illustration) with a height of 30 in. One electric motor driving a pump powers all motions—tramming, auger positioning, auger rotation and auger advance and retraction. All operations are independent. In drilling, which can be done at zero to full speed on either rotation or advance, the desired speed can be selected, after which pressing a button does the rest. With the standard drill boom, holes up to 9 ft. deep can be drilled at any height up to 5½ ft. above the floor. A longer boom may be obtained to permit drilling up to 7 ft. above the bottom.

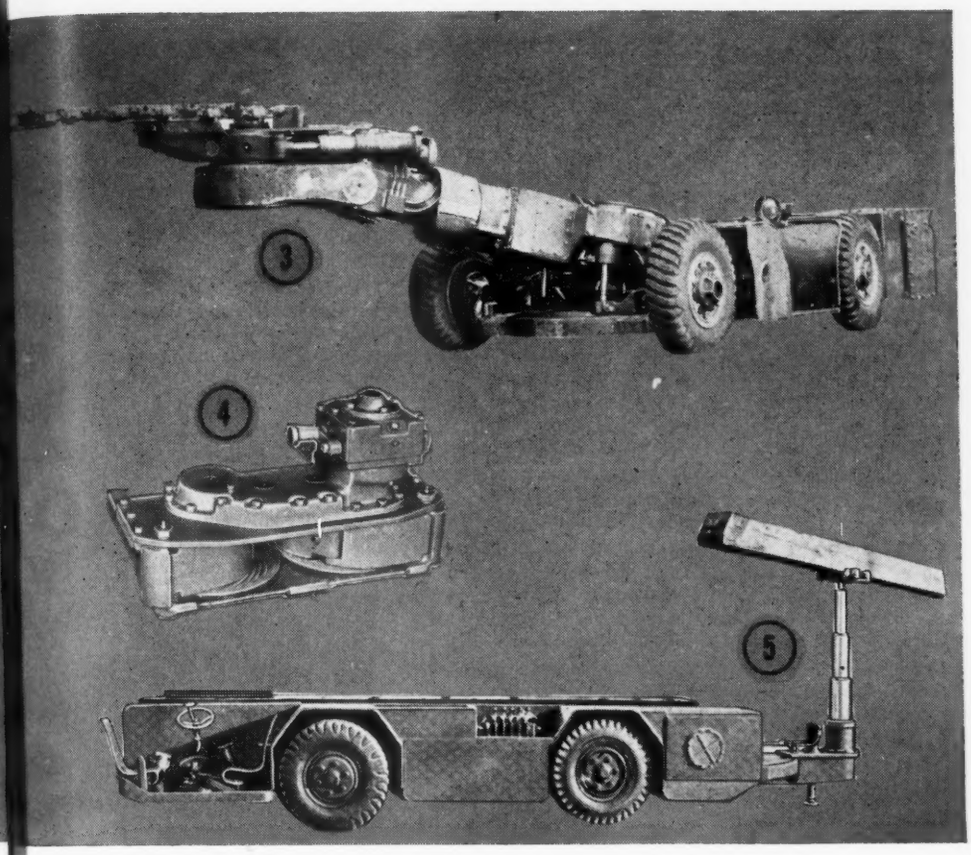
"Sulmet" cutter bits with tips of sintered carbide were another new product featured by Joy. Advantages cited by the company include a saving of approximately 18 percent in bit-setting time, faster cutting, less power, lower machine maintenance and a more favorable cutting pattern. The bits can be used in any chain accommodating ½x1-in. bits.

New timber setters and post pullers were other items displayed by Joy. The timber setter—a rubber-tired unit with two-wheeled drive and hydraulic cut-off saw—includes a holder on a telescopic jack mounted on a swinging boom also provided with a foot jack (see illustration). The timber can be raised to a height of 7 ft. 8 in. and can be set in any position. Over-all height of the unit is 35 in. and timbers are carried in the body of the car. All operations, except tramming, are hydraulically controlled.

The new Joy post puller (see illustration), available with either crawler or track mounting, provides a dislodging pull of 20,000 lb. at 15 f.p.m. and a drag-out pull of 2,000 lb. at 150 f.p.m. An optional cathead may be independently operated as a light-duty hoist. Over-all height is 32½ in. It may be used in the thickest seams, according to the company, simply by increasing the length of the jack pipes.

Joyce-Cridland Co., Dayton, Ohio—Newly improved Model 517 mine jack, 5- to 20-ton capacity, said to be five to nine times lighter than jacks of comparable capacity and to feature an improved pawl mechanism that increases ease of operation and efficiency.

Kennametal, Inc., Latrobe, Pa.—Kennametal rotary bits for shot-hole drilling in both strip and underground mining and the new percussion bits for drilling hard rock. The machine bits include a new shape for cutting in seams with abnormally hard impurities. The cutting edge is wider and the shank is heavier. The exhibit included new Kennametal augers with a spiral shape which eliminates grooving action or clogging, thus moving the material evenly and uniformly regardless of whether the drilling is wet or dry, the company states.



Lee-Norse Co., Charleroi, Pa.—Photographic display of conversions of 29U cutters to rubber mounting; also application of hydraulic swing to 56A mounted drills.

R. G. LeTourneau, Inc., Peoria, Ill.—New high-speed rubber-tired Model C Tournadozer (*Coal Age*, May, 1947, p. 160). Pictorial display and movies of other LeTourneau earthmoving equipment in operation.

Link-Belt Speeder Corp., Chicago—Pictorial display of Link-Belt Speeder shovels, cranes and draglines.

Marion Power Shovel Co., Marion, Ohio—Pictorial presentation of Marion stripping equipment.

Myers-Whaley Co., Inc., Knoxville, Tenn.—No. 2 "Automat" track-mounted loading machine with new-type control on the main frame 15½ ft. back from the coal face, plus "Centromatic" lubrication.

Northwest Engineering Co., Chicago—Photographic display of crawler- and rubber-mounted shovels, cranes, draglines and pull shovels.

Ohio Machinery Co., Cleveland, Ohio—New Caterpillar Model 25 double-drum cable control for scrapers; Gardner-Denver air compressors.

Page Engineering Co., Chicago—Page automatic dragline buckets and the Page reversible center-shank tooth point secured by a hook bolt.

Paris Mfg. Co., Paris, Ill.—Parmanco vertical (both gravity and power feed) and horizontal drills for prospecting and strip-mine work. A new-type drilling-head coupling is said to prevent loss of auger string through use of four holding lugs. Parmanco bits faced on both front and back also were shown by the company.

Frank Prox Co., Inc., Terre Haute, Ind.—New cutter bar and chain; Prox "Invincible ToolSteeL" cutter bits.

Salem Tool Co., Salem, Ohio—McCarthy horizontal and vertical rock-boring machines, Salem miners' tools, "Coal-Master" coal augers, heads and bits for both deep and strip mines, Salem electric drills, Salem cutter bits, etc. In connection with the McCarthy drills, the company featured new self-propelling facilities and ability to drill 40 per cent more holes per day, as well as ability to drill up to 12-in. holes 150 ft. in any earth formation.

Sprague & Henwood, Inc., Scranton, Pa.—Pictorial presentation of diamond core-drilling machine; samples of double-tube core barrels; diamond bits in sizes from 1½ in. to 15 in.; and a display of several grades and qualities of industrial diamonds.

Syntron Co., Homer City, Pa.—Gasoline-powered self-contained hammers (paving breakers, demolition tools, etc.)

Templeton, Kenly & Co., Chicago—Complete line of Simplex mine jacks, featuring the new No. 9225 timber jack. Weighing but 50 lb. but with a 5-ton capacity, the jack features square tubing and is of the telescoping type with double-cutting ratchet mechanism for use in erecting timbers.

Timken Roller Bearing Co., Canton, Ohio—Timken rock bits.

Bertrand P. Tracy Co., Pittsburgh, Pa.—Cutter chains, bars and bits; replacement parts.

Track and Trackless Haulage

American Car & Foundry Co., New York—New eight-wheeled 10-ton drop-bottom mine car (see illustration) built for Pardee & Curtin Lumber Co. Of ACF combination welded and riveted body design, the car is 29 ft. 1 in. over all in length. The body is 22 ft. 11 in. long inside, 7 ft. wide over the sides and 4 ft. high over the rails. Truck gage is 42 in. Four ACF-design "Lubricated" doors and fully automatic rubber-mounted couplers are included. Trucks, on 23-ft. centers, are four-wheeled bolster-type through-axle units with 14-in.-diameter ACF chilled-tread wheels equipped with Timken bearings. Weight of car and trucks is 11,300 lb. Capacity, loaded, with a 6-in. surcharge, is 12 tons; level, 10 tons. Also displayed: ACF rocker-type door-closing device, ACF reversible door-tripping device and ACF mine-car wheels.

American Mine Door Co., Canton, Ohio—Canton track cleaner, "Electri-Throw" switchthrowers, mine-signal systems, etc.

Armco Draining & Metal Products, Inc., Middletown, Ohio—Full-sized installation of Armco tunnel-liner plates for 16-ft.-span mine entry. Tunnel-liner plates are made in sections 4 ft. long and 18 in. wide and can be easily bolted together to line entries and provide coverings for substations, pumps and other equipment, according to the company.

Bethlehem Steel Co., Bethlehem, Pa.—New Bethlehem prefabricated mine-track systems. Designed for individual installations and prefabricated in the plant, the systems are shipped in rail lengths requiring no more than two men to handle them, the company states. Bethlehem wire rope, steel rail and switches, and hollow and solid drill steel also were shown, along with a pictorial display of high-strength corrosion-resisting Mayari R. Steel and the Bethlehem mine-car truck for eight-wheeled 10-ton mine cars.

Brown-Fayro Co., Johnstown, Pa.—Items from its line of cars, wheels, sheaves and rollers, rerailers and derailers, and room, car-spotting and haulage hoists, including the new Model HM "Double-Barney" car-spotting unit for handling cars at conveyor discharges (see illustration). The second barney makes operation

absolutely continuous, according to the company, since it always is ready to bring a new car into position, thus preventing stops and spillage. Exact positioning of cars is attained by limit switches. The unit can feed cars at a rate of as high as 40 f.p.m. It is self-contained and requires no jacks or foundations. It is powered by a 15-hp. motor and the normal rope pull is 12,000 lb. at a speed of 40 f.p.m. Return speed is 60 f.p.m.

Carnegie-Illinois Steel Corp., Columbia Steel Co. and Tennessee Coal, Iron & R.R. Co. (subsidiaries United States Steel Corp.)—Application of "Cor-Ten" light-weight high-strength abrasion-resisting steel in the construction of light-weight long-lived mine cars and other mining equipment; light-weight rails and steel mine ties.

Central States Industrial Supply Co., Cleveland, Ohio—Goodyear "Coal-Flo" belts, vulcanizing equipment and tools, how to repair belts and make them endless.

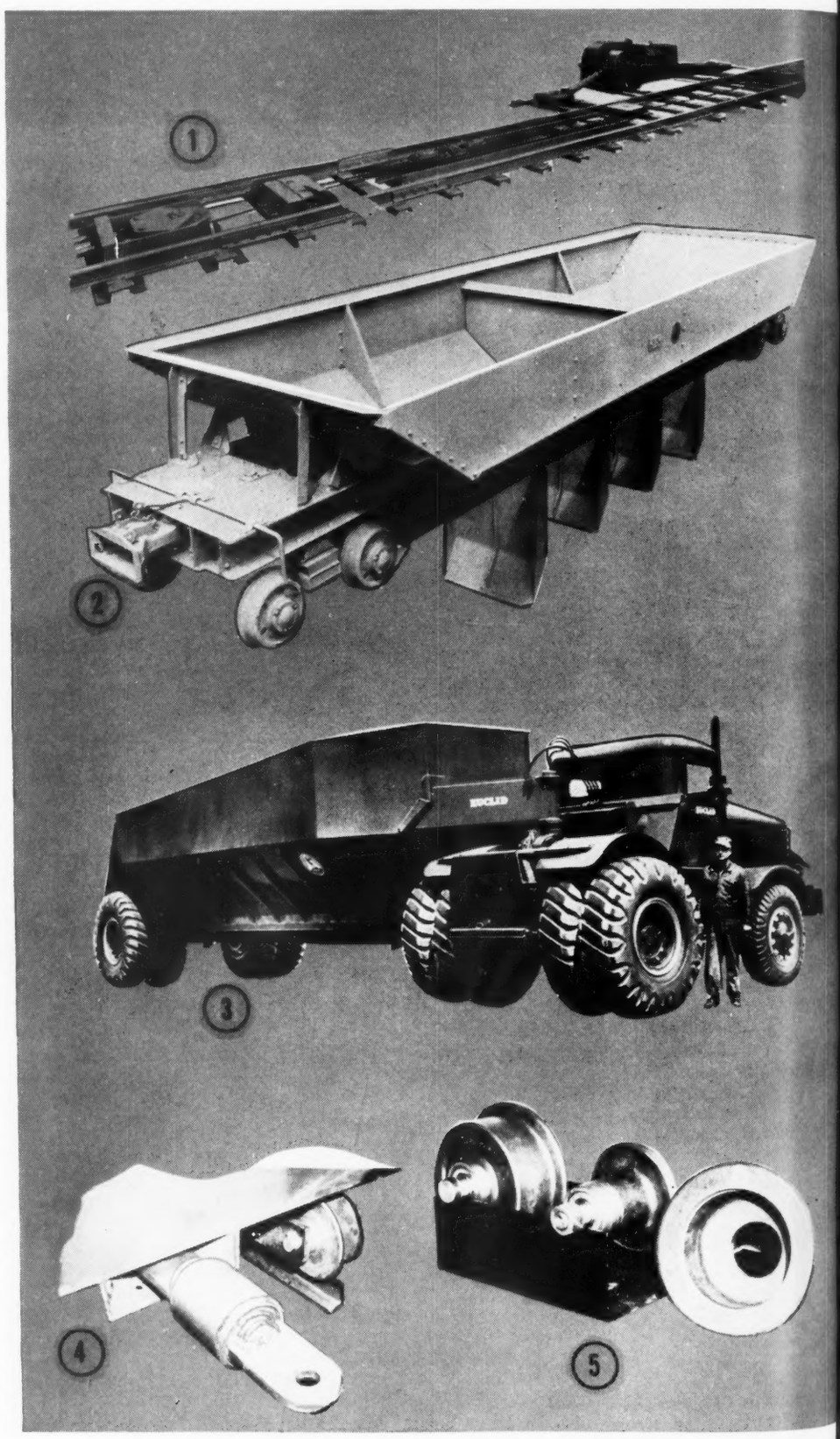
Cheatham Electric Switching Device Co., Louisville, Ky.—New-type electric track-switch controller (see illustration). The wire-terminal panel is connected to the main panel by knife switches and fuses so that for maintenance and repair the main panel can be lifted out without disconnecting any wiring. Switch-position indicating lights can be furnished on the same case or separately. Block-signal controls, mine signals, circuit controller for switch position, retarder for spring switches and other electric switch-throwing devices also were featured.

Differential Steel Car Co., Findlay, Ohio—Ten-ton eight-wheeled "Axless" truck mine cars with draft gear built into the coupler shank (see illustration). This shank includes buffer, spring draft and swivel, and is packed with lubricant. The coupling pin stands up in coupling position when desired. Differential also exhibited a 38-person "Mantrip" car with the same eight-wheeled trucks, and also a new-type mine-car wheel with replaceable shrunk-on or pressed-on rim (see illustration). This wheel, the company states, cuts the cost of replacing worn-out wheels to less than one-half that with conventional wheels. The wheel center is single-web construction and the forged steel rim is double webbed.

The air controlled rotary mine-car dumper offered for the first time by this company was shown photographically along with a four-car refuse train which operates up a 10-percent grade. Each car is equipped with "Axless" trucks individually motor driven. The control is the multiple-unit type and dynamic braking is included.

Enterprise Wheel & Car Corp., Bristol, Va., and Huntington, W. Va.—Low-vein four-axle rotary-dump car; low-vein four-axle end-dump car equipped with rubber shock-absorbing bumper and spring draft gear; longitudinal bottom section from a four-axle mine car featuring Enterprise double-acting spring bumpers; cut-away wheel showing Enterprise special patented application of anti-friction bearings for mine cars.

Euclid Road Machinery Co., Cleveland, Ohio—New Model 2TDT-94W 40-ton-capacity bottom-dump Euclid coal hauler (see illustration). Powered by a 275-hp. diesel engine, the truck offers speeds from 3 to 31.2 m.p.h. according to the company. Maximum loading height is 10 ft. 7 in.; capa-



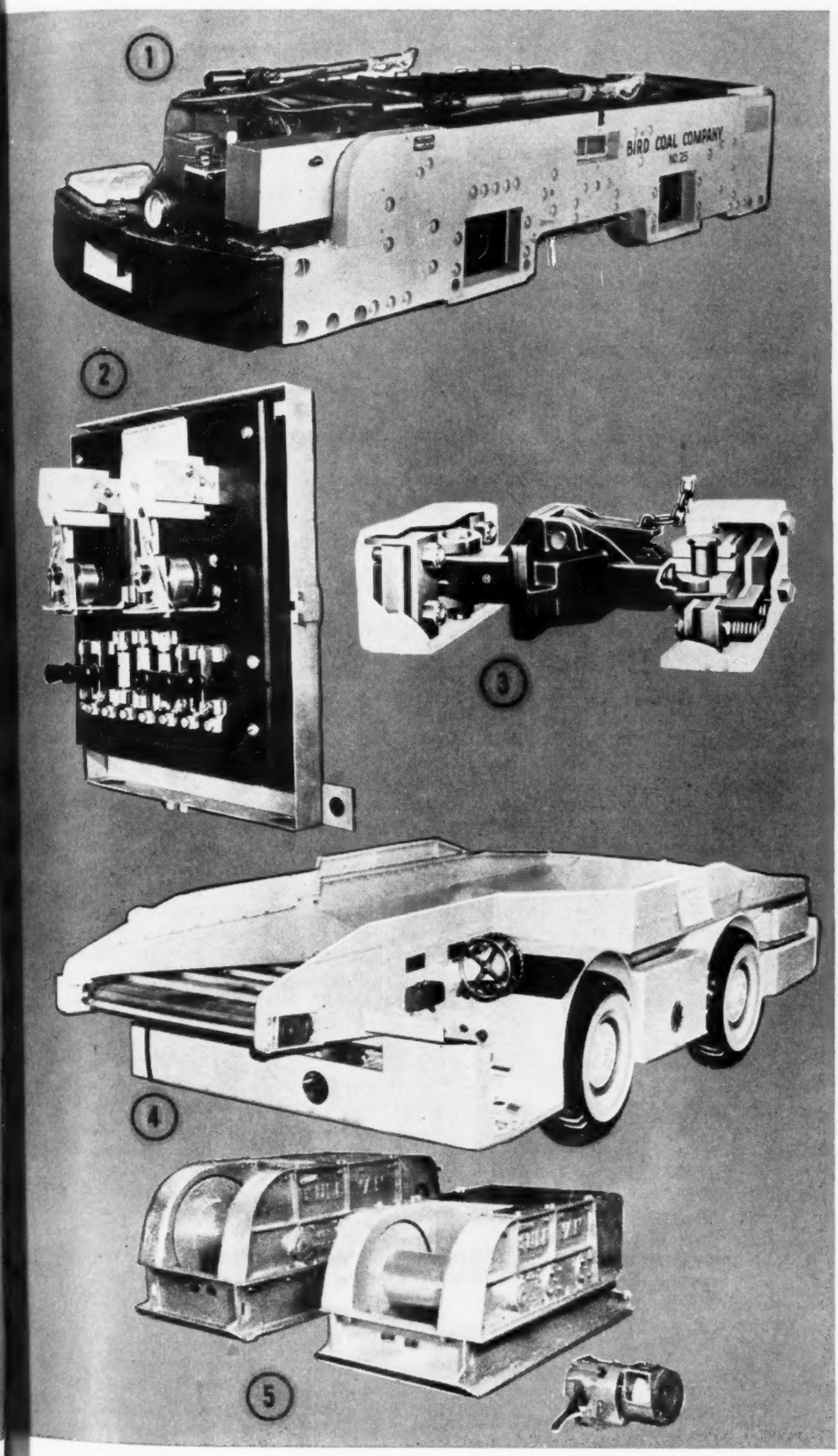
Brown-Fayro "Double-Barney" car-spotting unit (1); ACF 10-ton drop-bottom mine car (2); Euclid 40-ton coal hauler (3); Differential mine-car coupler (4); Differential wheel with replaceable rim (5).

city, struck measure, 50 cu.yd. Tire sizes are: 13.00x24, front; 18.00x24 duals, drive and trailer wheels. Also displayed were Model F 15-ton rear-dump and Model T 22-ton rear-dump Euclids designed for heavy-duty off-the-highway service. The Euclid double-reduction planetary-type-drive axle, standard on the Model T, was displayed in operation.

Flood City Brass & Electric Co., Johnstown, Pa.—Car-spotting hoist.

Goodman Mfg. Co., Chicago—Goodman 15-ton low-height mine locomotive, 120-hp. motors on each truck, hydraulic brakes; Goodman 97-HCD-30 belt conveyor for shuttle-car loading; and the new Goodman Type 99-5 belt conveyor.

A special joint and an articulated design that permits operation over uneven bottom with the siderails always in compression, thus making it always possible to install a predetermined length of belt, were cited as features of the Type 99-5 belt conveyor. It includes 5-in. side channels and is designed for belts 36 in. wide and up. Simplicity of moving and great strength are among the other features noted by the company.



Goodman 15-ton haulage locomotive (1); Cheatham track-switch controller (2); Ohio Brass Form-8 automatic coupler (3); Jeffrey special-wide shuttle car (4); Sullivan car and rope pullers (5).

Harnischfeger Corp., Milwaukee, Wis.—Model of P. & H. hoist for loading boom, photographic display of P. & H. hoists available in capacities up to 15 tons.

Hewitt-Robins, Inc., Robins Conveyor Division, New York—Robins troughing and return idlers, Hewitt conveying and power belting, Hewitt air and water hose and Robins conveyors.

Robert Holmes & Bros., Danville, Ill.—Holmes welded-steel engine bed frames, rope sheaves, mine cages, rotary dumps and car pullers.

Irwin Foundry & Mine Car Co., Irwin, Pa.—Eight-ton rotary-dump mine car featuring all-welded high-strength alloy-steel construction, metalline bearings (*Coal Age*, September, 1946, p. 150).

Jeffrey Mfg. Co., Columbus, Ohio—New special-wide shuttle car with built in elevating discharge conveyor (see illustration). Featuring hydraulic operation and four-wheeled drive and steer, the shuttle car has a capacity of 8 tons with average topping. Chain and belt conveyors were another Jeffery feature.

Joy Mfg. Co., Pittsburgh, Pa.—Sullivan slow-speed heavy-duty hoists and car pullers (Types CHL and CHD), Sullivan RH room hoists and the Sullivan RP rope puller with a ¾-hp. motor and a capacity of 300 ft. of 3/16-in. rope. It is used for pulling ropes off car- or trip-spotting hoists and is designed for remote operation. It has a rope pull of 200 lb. at 110 f.p.m. Shaking, chain and belt conveyors also were displayed by Joy.

Lee-Norse Co., Charleroi, Pa.—Two jeeps for carrying personnel and light materials. One is a low-coal trolley unit 24 in. high and the other a combination trolley-battery type, said to be especially useful in case of a power failure.

Link-Belt Co., Chicago—Link-Belt conveying, dumping and hoisting equipment.

Mack Trucks, Inc., New York—New Model LR four-wheeled truck to be used as a 15-ton dumper or a tractor to pull a 30-ton trailing load. It includes the Mack "Planidrive" rear axle containing Mack-patented power divider insuring positive traction on both wheels. This rear axle is mounted on rubber blocks.

Another truck exhibited was the Mack six-wheeler with a capacity of 60,000 lb., gross-vehicle weight, and capable of 100,000 lb. gross train weight. It also can be used as a dumper of 15-tons pay-load capacity. It has hydraulic steering and an air-assisted clutch of the two-plate type with 460 sq. in. of area.

The new transmission for those two trucks was shown in cut-away form. This Mack Model TRDX51 eight-speed transmission has forced lubrication to all gears on the main shaft.

Separately shown was the Mack SW32 six-wheeled balanced bogie with power divider for use in the LMSW-M six-wheeled truck.

Mining Safety Device Co., Bowerstown, Ohio—Model of the Nolan rotary mine-car dumper and controls; representative samples of the Anchor line of rerailers, puller-jacks, box-car-door pullers and track braces.

National Malleable & Steel Castings Co., Cleveland—Automatic couplers for mine cars, including one of the heavier self-centering types. Also shown were knuckle-type couplers, Naco steel mine-car wheels, swivel hitchings, friction draft gears and special horn-type couplers for long-overhang four-wheeled cars. The exhibit included adapter castings for using new automatic-coupler cars with old link-and-pin cars.

Ohio Brass Co., Mansfield, Ohio—New O-B automatic Form-8 mine-car coupler (see illustration), said to provide increased track stability by preventing jack-knifing under push or buff. The newly designed Form-8 coupler substitutes for a single pivot point a pushing face between cars 20 sq. in. in area so that as cars zig-zag a side thrust in the opposite direction from the car wheels is developed that forces the cars back into center-to-center alignment. The coupling features a gathering range of 15 in., positive interlock, automatic self-centering and rubber buffing pads, the company states.

Portable Products Corp., Pittsburgh, Pa.—Car stops, derailers and other haulage devices.

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Pittsburgh, Pa.—"Homocord" conveyor belting and new "Ray-Man" and "Whip-Wire" conveyor belting. The "Ray-Man" belting features a rayon strength member making it possible to operate on long centers and with high lifts under high tension. The "Whip-Wire" belt provides the same advantages, according to the company.

Sanford-Day Iron Works, Inc., Knoxville, Tenn.—A 6-ton drop-bottom mine car, 18x6 ft., 38 in. high, 42-in. track gage, featuring automatic coupler, overlapping ends for continuous conveyor loading without spillage and newly installed air brakes; also a 12x6 ft. mine car, 20 in. high, capacity 80 cu.ft.

Sterling Steel Casting Co., East St. Louis, Ill.—Sterling cast-steel mine-car wheels and various steel castings made for mine cars and other running equipment. The advantages of a perfectly balanced mine-car wheel were demonstrated by means of a balancing machine.

Watt Car & Wheel Co., Barnesville, Ohio—Eight-wheeled four-point-suspension 10-ton all-steel mine car identical with the new cars at Willow Grove No. 10 and Piney Fork mines, Hanna Coal Co. Dimensions are: 16 ft. 6 in. by 7 ft. wide inside; height, 48 in. Willison couplers are used.

West Virginia Steel & Mfg. Co., Huntington, W. Va. — Prefabricated track by a large scale model using 8-lb. rails. The exhibit included parallel switch throws, composite ties on creosote-treated bases and manganese frogs.

Preparation and Utilization

Allis-Chalmers Mfg. Co., Milwaukee—"Low Head" 6x16-ft. screen, "Ripl-Flo" 5x12-ft. screen and a 10x8-in. Type CWF solids-handling pump for coal preparation.

Barber-Greene Co., Aurora, Ill. — Barber-Greene coal-handling equipment, including loaders and pilers.

Barrett, Haentjens & Co., Hazleton, Pa. — New Hazleton Type VS vertical sludge pump (see illustration); capacity, 50 g.p.m. at a 100-ft. head to 5,000 g.p.m. at a 20-ft. head. The pump features a twin-volute housing, two discharge pipes discharging into a U-header, water-lubrication and water bearings, adjustable wearing rings and exposed shaft. It has no stuffing box and requires no priming equipment, the company states, and provides positive head on the suction.

Bird Machine Co., South Walpole, Mass.—18x28-in. Bird continuous centrifugal filter designed to handle a wide range of slurries varying in thickness, solid content and coarseness.

Bituminous Coal Institute, Inc., Washington, D. C.—Booklets, advertisements and other information released by BCI to the public on the economics, use and importance of coal, miners' wage scales, living and working conditions; continuous showing of the movie, "The Magic of Coal."

Bituminous Coal Research, Inc., Pittsburgh, Pa.—Informative display, literature and advertising on the BCR research program; full-scale models of the smokeless stove tested in a Pittsburgh home and the Moore smokeless stove being put into commercial production by Conlon-Moore Corp., one of the 18 stove manufacturers cooperating with BCR.

Bixby-Zimmer Engineering Co., Galesburg, Ill. — Vibrating, dewatering, shaking and drying screens, featuring a new stainless-steel centrifugal dryer screen, ⅛-in. wire, ½-mm. opening. Other products were a new stainless-steel triangular-opening dewatering screen, said to reduce blinding on certain types of installation, and a recently developed heat-dryer screen that features a gasket on framing made of rubber and asbestos to withstand heat.

Brown-Fayro Co., Johnstown, Pa.—Layer-loading hoists, oil-spray outfits.

Centrifugal & Mechanical Industries, Inc., St. Louis — A scene-in-action demonstration of the C-M-I continuous centrifugal dryer; also photographs of the dryer applications in coal-preparation plants.

Cities Service Oil Co., New York—"Coaldres" for dustless-coal treatment.

Combustion Engineering Co., Inc., Chicago, Ill.—Model of the C-E Raymond flash dryer for drying fine coal ⅜-in. and less from any initial moisture to any final moisture required.

Deister Concentrator Co., Ft. Wayne, Ind.—"SuperDuty" coal-washing table for cleaning fine coal, including self-oiling fully-inclosed "Concenco" anti-friction head motion and other features of latest "Super-Duty" installations; also "Concenco" spray nozzles and a splash-proof "Concenco" feed distributor.

Deister Machine Co., Ft. Wayne, Ind.—Double-deck 4x10-ft. "Plat-O" vibrating screen; design, construction and operation of the Deister "Plat-O" coal-washing table.

Fairmont Machinery Co., Fairmont, W. Va.—Photographic display of Chance sand-flotation cleaning plants and other coal-preparation equipment.

Hewitt-Robins, Inc., Robins Conveyor Division, New York — Robins "Car Shakeout" for unloading railroad cars, "Eliptex" dewaterizer for dewatering fine 'washed coal and Robins screen cloth.

Robert Holmes & Bros., Danville, Ill.—Holmes lowering spiral 3 ft. in diameter with 30-deg. pitch, made in 3- to 12-ft. diameters and with pitches of 25 to 40 deg.; fabricated from 10-gage to ¼-in. plate and used for preventing degradation and segregation in storage bins; also a photographic display of Holmes spirals, "Dust-O-Lator" bin gates for removing degradation at truck-loading points; sluices and parts for conveying equipment. A bench-model laboratory coal pulverizer also was shown, along with a 7x6-in. hammermill crusher for reducing laboratory samples from 2 in. down to 4-mesh.

Humphreys Investment Co., Engineering Division, Denver—Humphreys spiral concentrator operating on ¼-

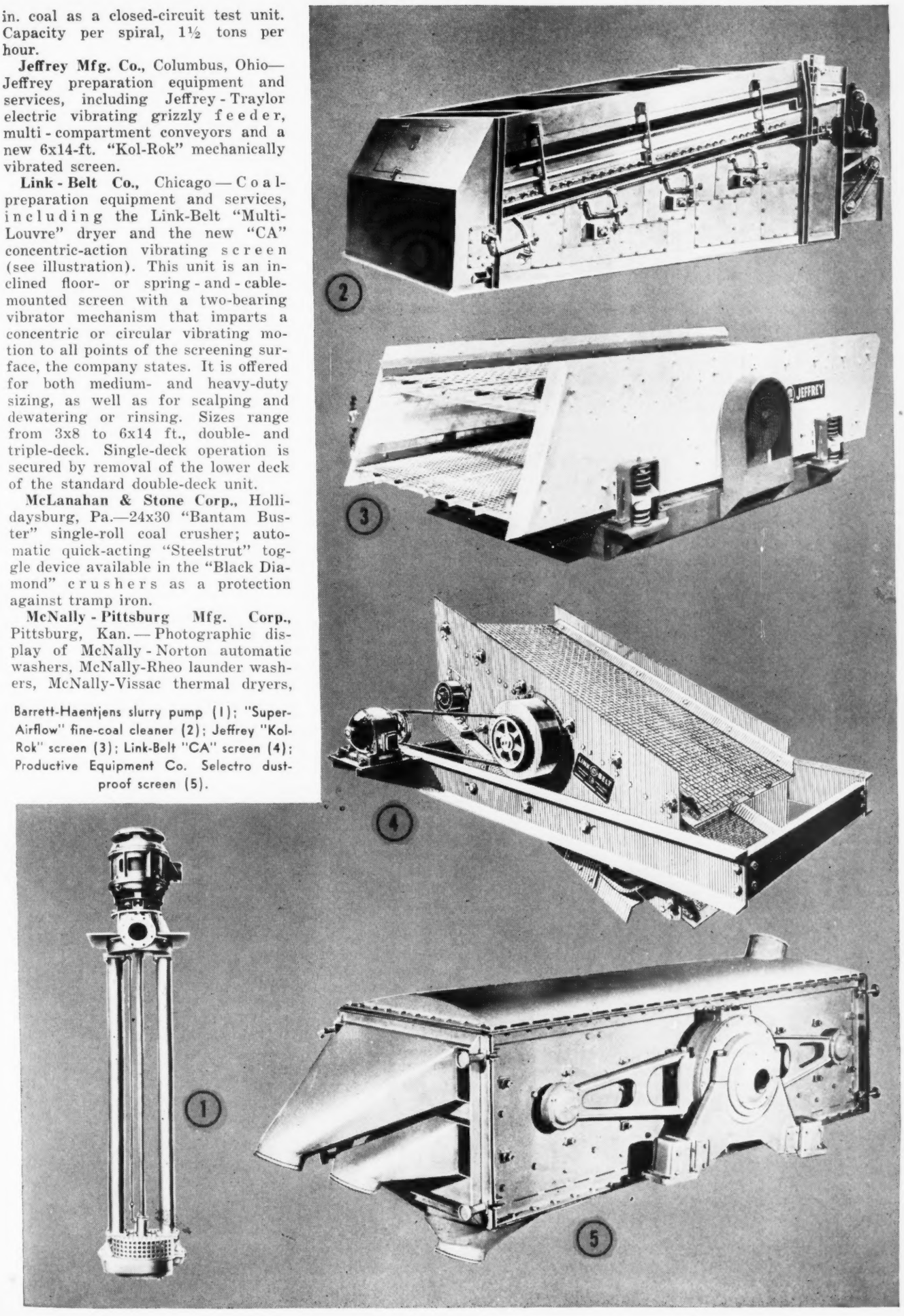
in. coal as a closed-circuit test unit. Capacity per spiral, 1½ tons per hour.

Jeffrey Mfg. Co., Columbus, Ohio—Jeffrey preparation equipment and services, including Jeffrey - Traylor electric vibrating grizzly feeder, multi - compartment conveyors and a new 6x14-ft. "Kol-Rok" mechanically vibrated screen.

Link - Belt Co., Chicago — Coal-preparation equipment and services, including the Link-Belt "Multi-Louvre" dryer and the new "CA" concentric-action vibrating screen (see illustration). This unit is an inclined floor- or spring - and - cable-mounted screen with a two-bearing vibrator mechanism that imparts a concentric or circular vibrating motion to all points of the screening surface, the company states. It is offered for both medium- and heavy-duty sizing, as well as for scalping and dewatering or rinsing. Sizes range from 3x8 to 6x14 ft., double- and triple-deck. Single-deck operation is secured by removal of the lower deck of the standard double-deck unit.

McLanahan & Stone Corp., Hollidaysburg, Pa.—24x30 "Bantam Buster" single-roll coal crusher; automatic quick-acting "Steelstrut" toggle device available in the "Black Diamond" crushers as a protection against tramp iron.

McNally - Pittsburg Mfg. Corp., Pittsburg, Kan. — Photographic display of McNally - Norton automatic washers, McNally-Rheo launder washers, McNally-Vissac thermal dryers,



Barrett-Haentjens slurry pump (1); "Super-Airflow" fine-coal cleaner (2); Jeffrey "Kol-Rok" screen (3); Link-Belt "CA" screen (4); Productive Equipment Co. Selectro dust-proof screen (5).

McNally-Carpenter centrifugal dryers and McNally - Pittsburg preparation plants.

Productive Equipment Corp., Chicago, Ill.—"Selectro" latest-type fully inclosed dust-tight vibrating screen, said to be fully adjustable, able to use any type of screen or wire cloth and provide positive eccentric action. (See illustration.)

Reich Bros. Mfg. Co., Indianapolis, Ind. — "Delatester" specific - gravity coal tester, said to provide a quick, efficient test without requiring experienced help.

Roberts & Schaefer Co., Chicago—Complete full-sized RandS Hydroseparator to clean 7x2-in. coal at 275 tons per hour, RandS Hydrotator and RandS Hydro classifier, all for the Franklin County Coal Corp., Inc.; also a special automatic refuse-control valve for the Hydrotator and Hydro classifier units. This double butterfly-type valve is governed by the principle of differential density in the tank and operates to release or hold back refuse.

Roberts & Schaefer also featured the new "Super-Airflow" cleaner for coal finer than 10 mesh (see illustration). Specifically, according to the company, the "Super - Airflow" unit offers a cleaning deck and resistance pack which oscillates as an integral unit with short, rapid strokes. The deck is longer and provides four draws for refuse. Less air volume is required for stratification, it is stated. The zoning plate has been eliminated because the shaking deck automatically maintains a uniform bed. Short oscillation permits a tight air seal with rubberized fabric or canvas. Very-fine refuse sifts through the deck to form a high-ash hutch material, which is removed by a built-in screw conveyor.

John A. Roebling's Sons Co., Trenton, N. J.—Screen cloth.

Simplicity Engineering Co., Durand, Mich.—Simplicity 4x12-ft. Model D triple-deck gyrating screen featuring positive - action movement with double-crowned decks and four - way tension on screen cloth. Each deck in this multiple deck type has 2½ deg. more inclination than the deck above, the company points out.

Syntron Co., Homer City, Pa.—Vibrating feeders, bin vibrators and the new Syntron vertical vibratory feeder-conveyor. The latter unit conveys coal vertically upward by means of a spiral flight. Primarily for fine coal, the unit has the advantages, among others, according to the company, of ease in installation and reduced space requirements.

W. S. Tyler Co., Cleveland, Ohio—"Ty-Rock" screens, "Ro-Tap" testing units and sieves, sample splitters and Tyler screen cloth.

U. S. Geological Survey, Washington, D. C.—Coal investigations now in progress; display of maps, literature and other data available.

Wedge Wire Corp., Cleveland, Ohio —"Kleenslot" wedge-wire screens in various metals for mining applications, featuring a lighter aluminum screen for dewatering and drying.

Power Units and Equipment

American Mine Door Co., Canton, Ohio—New permissible starter with aluminum case, using Square D equipment, for 2- to 5-hp. applications.

American Steel & Wire Co. (subsidiary United States Steel Corp.), Cleveland, Ohio—"Tiger Brand" electric wire and cables and rail bonds, including the new "Tigerweld Clip-On" bond.

Anaconda Wire & Cable Co., New York—"Securityflex" mining cables and cords, including parallel-duplex mining-machine cables with ground wires, synthetic and rubber-jacketed cables, flame-resistant cables, shot-firing and telephone cables, featuring resistance to flame by the Pennsylvania Department of Mines test.

Albert & J. M. Anderson Mfg. Co., Boston, Mass.—Type N battery charging plugs and receptacles, line plugs and receptacles, welding accessories, line material, switches and controls; also the new "Multitap" plug that provides connections for six plugs and contains two fuses, maximum 30 amp.

Beckley Machine & Electric Co., Beckley, W. Va.—Field and armature coils, line materials, cable guides with steel centers and Micarta rings mounted on ball-bearing swivels.

The Buda Co., Harvey, Ill.—Three diesel engines: 6DC844, six cylinders, 180 hp. without super-charger; 6DCS-844, six cylinders, 225 hp. with supercharger; 8DCS, eight cylinder, 300 hp. with supercharger. The horsepower ratings are all at 1,800 r.p.m. Demonstration of diesel -engine nozzle testers.

Cummins Engine Co., Columbus, Ohio—Cummins diesel engines for haulage and shovel applications, including the Model NHBS-600, 275 hp., and the Model HBI-600, 150 hp.

Dow Corning Corp., Midland, Mich. —Silicone magnet-wire insulation and silicone insulation components; several stators, armatures and so on illustrating uses of silicone insulation and including several tested at high temperatures in the laboratories; comparison motors showing increased power output with silicone-insulated units; dry-type distributing transformers showing reduction in size and weight. Also included in the exhibit was a group of silicone-wound automotive generators and a display board carrying the component parts of a silicone-insulated motor.

Thomas A. Edison, Inc., West Orange, N. J.—New D-5 cell for the higher types of shuttle cars; C-5 for low-type shuttle cars; also a photographic display of a trammer battery and a shuttle-car battery.

Electric Controller & Mfg. Co., Cleveland, Ohio—"Line-Arc" sectionalizer for control of individual mine sections; reversing frequency-relay-type controller for wound-rotor motor as set up for an aerial tramway; dust-proof and waterproof full-voltage a.c. starter; inclosed rectifier panel for a.c. operation of Type WB brake used on cranes, hoists, tramways, etc., which provides instant stopping and starting, requires no motors, gears or pumps and is said to eliminate a.c. chatter.

Electric Railway Improvement Co., Cleveland, Ohio—"Erico" arc-welded rail bonds.

Electric Storage Battery Co., Philadelphia—Three sizes of Exide-Ironclad MVM cells for locomotive and shuttle-car use and an Exide control unit for automatic charging—a temperature-compensated-voltage device said to simplify charging to the mere pushing of a button.

Elreco Corp., Cincinnati—Single-conductor and multiple-type distribution boxes complete with safety interlocks; line materials and an improved disconnect switch with a steel channel base to hold parts permanently in alignment.

Flood City Brass & Electric Co., Johnstown, Pa.—Headlights for underground mobile equipment; transfer switches; trolley wheels and gliders; electric vulcanizer; line materials and a new permissible switch for hoists. This switch contains a De-ion breaker with thermal overload. Also shown was a new mercury starting switch rated 100 amp. for 250-volt service.

General Electric Co., Schenectady, N. Y.—Strip-mining power equipment, featuring the G.E. portable junction box.

General Electric Co., Deltabeston Division, Schenectady, N. Y.—Deltabeston cables and magnet wire using new silicone varnishes in combination with both glass and asbestos fibers.

General Motors Corp., Detroit Diesel Engine Division, Detroit—Four Series-71 two-cycle diesel engines in three, four, six- and twelve-cylinder types. All have cylinders with a 71-cu.in. displacement with interchangeable pistons, connecting rods, gears and many other parts. The exhibit included a demonstration injector-spray unit.

Gould Storage Battery Corp., Depew, N. Y.—Gould "Kathanode" storage battery showing new-type bridge designed to level off sediment and prevent shortage of plates and reduced power. A new-type lead-insert cover,

now a feature of the "Kathanode," is said to prevent acid leaking and working up around parts, with the resulting corrosion and loss of efficiency of the battery.

Guyan Machinery Co., Logan, W. Va.—Rail-bond welders, including the new "Lo-guy," 8½ in. high, four taps, 200-amp. capacity, 140 lb., with a set of rollers on the bottom for moving it along the rail; floor-type slate-picker's heater; locomotive cab heater; Guyan resistors for mine and steel-mill equipment; sealed-beam headlights for locomotives and other mobile units, using automobile No. 4030 lamps operating on 6 volts a.c. furnished by a power-pack powered from 250 volts d.c.; special resistors for loading machines and the "Pu-mo" d.c. motor starter, which incorporates a relay to shunt out the resistance when the motor is up to speed.

Harnishfeger Corp., Milwaukee, Wis.—P. & H. "Magnetorque" drive for large electric and diesel shovels and draglines. Use of the "Magnetorque" eliminates the need for a hoist generator and provides Ward-Leonard performance with stepless control, it is stated. A new induction controller used in connection with the "Magnetorque" drive on P. & H. electric shovels eliminates all make and break contacts in the control system, it is stated.

I-T-E Circuit Breaker Co., Philadelphia—Type KSC automatic reclosing sectionalizing circuit breaker; Type KSA automatic recloser for switchboard mounting.

Mines Equipment Co., St. Louis—"Safety Circuit Center" (April, 1947, *Coal Age*, p. 97); also plugs and receptacles for cable connecting and attachment to boxes, and samples of four-conductor shielded telephone and signal cable and connectors.

Mosebach Electric & Supply Co., Pittsburgh, Pa.—New Type S "Quick-Connecting" feeder splicer, furnished in three sizes for wires 211,600 to 500,000 cir. mil, 500,000 to 1,000,000 cir. mil and 1,000,000 to 1,500,000 cir. mil. Different-sized cables can be connected and the splicer is quickly disconnected for re-use, the company states. Also shown was the new "Mesco" smooth under-run trolley switch featuring a grooved holding connection that facilitates connection of trolley wire; trolley-tap fuse holder; mercury starting switch for d.c. motors up to 2 hp.; fan safety-signal device indicating revolutions and water-gage; "Mescoweld" rail bonds, trolley clamps and other line material; operating model of the Fred J. Bucher power-leak detector and indicator that detects leakage current from various causes equivalent to 5 to 50 milliamp. at full line voltage and up, and which also can be used, it is stated, to indicate location and position of switches, etc.

National Electric Coil Co., Columbus, Ohio—"Fiberglas" sleeving, high-temperature and moisture-proof electrical-motor coils and motor parts, and "Fiberglas" and glass-cloth insulating materials.

Ohio Brass Co., Mansfield, Ohio—Electrical-control devices, including Types LG (permissible) and M (open-type) multiple-interlocking distribution boxes, Types BDG (gasproof) and BD (open-type) automatic motor starters, Type FC permissible splice box, "Mechano" plugs, fused trolley taps, plier-type ground clamps, and smooth under-run trolley, line and feeder materials.

Ohio Carbon Co., Cleveland, Ohio—Carbon brushes; carbon contacts for controllers; carbon rings for clutches and water-pump seals; all types of commutator burnishers and a bottle display of ingredients, totaling about 50, used in making carbon brushes.

Ohio Machinery Co., Cleveland, Ohio—Caterpillar D1300 diesel engine hooked to a generator and a Caterpillar diesel-electric set.

The Okonite Co., Hazard Insulated Wire Works Division, Wilkes-Barre, Pa. — "Hazaprene" flame-resisting mining cables, "Okoprene" high-voltage shovel cables, "Spiralweave" fungus-resisting borehole cables and other electric wire and cable for mining use, featuring the Pennsylvania flame test.

Owens-Corning Fiberglas Corp., Toledo, Ohio — "Fiberglas"-insulated replacement coils, glass-insulated mine armatures, a complete line of "Fiberglas" insulating materials both untreated and treated. A motor-generator set was used to demonstrate the ability of a glass-insulated motor to stand severe overloads. The exhibit included a cut-away dry-type transformer showing the use of glass insulation, as well as an armature and a stator both in the process of being wound with glass-insulated coils. The ability of the new "Fiberglas" high-temperature textile materials to withstand 2,000 deg. F. continuously was demonstrated (standard "Fiberglas" stands 1,000 deg. F. continuously, according to the company).

Penn Machine Co., Johnstown, Pa.—"Superweld" rail bonds.

Pennsylvania Electric Coil Corp., Pittsburgh, Pa.—Armature and field coils, the latter vacuum-impregnated.

Philco Corp., Storage Battery Division, Trenton, N. J. — New-type AMH-P 31 1500-amp. hr. storage battery, designed for use in "power tanks" for drilling, cutting and loading machines. Philco "Thirty" Type XL-P13 shuttle-car batteries; Type 3AMA 25 mine-locomotive battery.

Post-Glover Electric Co., Cincinnati—Complete line of steel-grid resistors for mining machines, locomotives, hoists, electric heaters, welders and d.c. motor starters; also automatic transfer switches.

Reliance Electric & Engineering Co., Cleveland—Explosion-proof motors for mine work, emphasizing use of factory-built spare parts; motors and parts with Class B insulation for heavy-duty operation and to get the required performance in the smallest possible space.

John A. Roebling's Sons Co., Trenton, N. J.—Electrical wire and cable.

Rome Cable Corp., Rome, N. Y.—Rome wire and cable; three-conductor "Neoprene" flame-resistant mining cable.

Simplex Wire & Cable Co., Cambridge, Mass.—"Tirex," "Anhydrex" and other electrical cables and cords for mining service, including "Neoprene"-jacketed types; featuring flame resistance according to the Pennsylvania Department of Mines test and also uninsulated ground wires.

United States Rubber Co., New York—"Royal" mining-machine and locomotive cables, featuring the new "Royal Master" cables with each conductor insulated with 90-percent pure rubber for greater electrical and physical strength.

Westinghouse Electric Corp., Pittsburgh, Pa.—New "Lifelime" motors (*Coal Age*, October, 1946, p. 168), Type CSP gearmotors, locomotive gears, explosion-tested linestarters and other electrical products.

Materials and Supplies

Allied Steel Products, Inc., Cleveland, Ohio—Special steels for maintenance and repair work, including special welding steels, electrodes and hard-surfacing rods and also including the new "Re-Nu Edge" blade bar for bulldozer and similar service (see illustration). The edge is welded to the blade and the weld is covered with a thin layer of hard surfacing. Blade life, according to the company, is prolonged many months.

Ahlberg Bearing Co., Chicago, Ill.—New mine-car-wheel seals in conjunction with Bower tapered-roller bearings; Ahlberg ground bearings; CJB new bearings, Bower straight-roller bearings, pillow blocks, other bearing applications.

American Chain & Cable Co., American Cable Division and Hazard Wire Rope Division, Bridgeport, Conn.—All types of wire ropes for strip and underground coal mining; the new "Acco-loc" safety splice for making slings on ⅛-in. to 1½-in. rope. This splice consists of a solid sleeve pressed on with a special tool.

American Cyanamid Co., New York—Pictorial display of explosives and permissible powders; "Filt-R-Still" water demineralizer for community

water-supply-system installations.

Austin Powder Co., Cleveland, Ohio —Pictorial display of Austin high explosives, permissibles, black powder and blasting supplies for mining use.

American Mine Door Co., Canton, Ohio—Cable splicers and the new Canton locomotive headlight. Made with a cast-aluminum split case, it features a sealed-beam lamp with cushion for quick replacement.

American Steel & Wire Co. (subsidiary United States Steel Corp.), Cleveland, Ohio—"Tiger Brand" wire rope.

Armco Drainage & Metal Products, Inc., Middletown, Ohio — Standard "Steelox" prefabricated steel buildings available in various sizes, 8 to 24 ft. wide and 8 to 16 ft. high; can be readily erected, dismantled and reassembled in another location as necessary, according to the company. Panels are self-aligning with positive joints and weather-tight all-steel construction includes doors and windows. Pictorial display of "Armco" corrugated arches for equipment housings.

Atlas Powder Co., Wilmington, Del.—"Rockmaster" system of multi-second delayed blasting for stripping and quarrying; Atlas permissibles in re-dipped, sprayed and pre-waxed cartridges.

Baker-Raulang Co., Cleveland, Ohio, **J. H. Fletcher & Co.**, Chicago—New Baker mine tractor (*Coal Age*, May, 1947, p. 162), and new Fletcher supply trailers (see illustration). The latter are made in both the three-wheel-steer and caster types, the latter for use where the loads do not exceed 10 ft. in length. Pulled by Baker tractors, the trailers are offered to facilitate handling props, long timbers, other material and men underground. They may be coupled together and operated as a train or used individually.

Bearing Service Co., Pittsburgh, Pa.—B.S.C. line of bearings in the larger, heavier series; "Bantam" spherical roller bearings; "Sealmaster" ball-bearing head-end units for Jeffrey 61-AM conveyors.

Beckley Machine & Electric Co., Beckley, W. Va.—"Bemeco" LT-300 locomotive controller only 20 in. high for use on units up to 6 tons; complete motor-driven cable reel, ball-bearing mounted, for mine locomotive; Westinghouse hydraulic brakes for mine locomotives; headlights for locomotives and other mobile equipment.

Broderick & Bascom Rope Co., St. Louis, Mo.—"Yellow Strand" braided wire rope and safety slings.

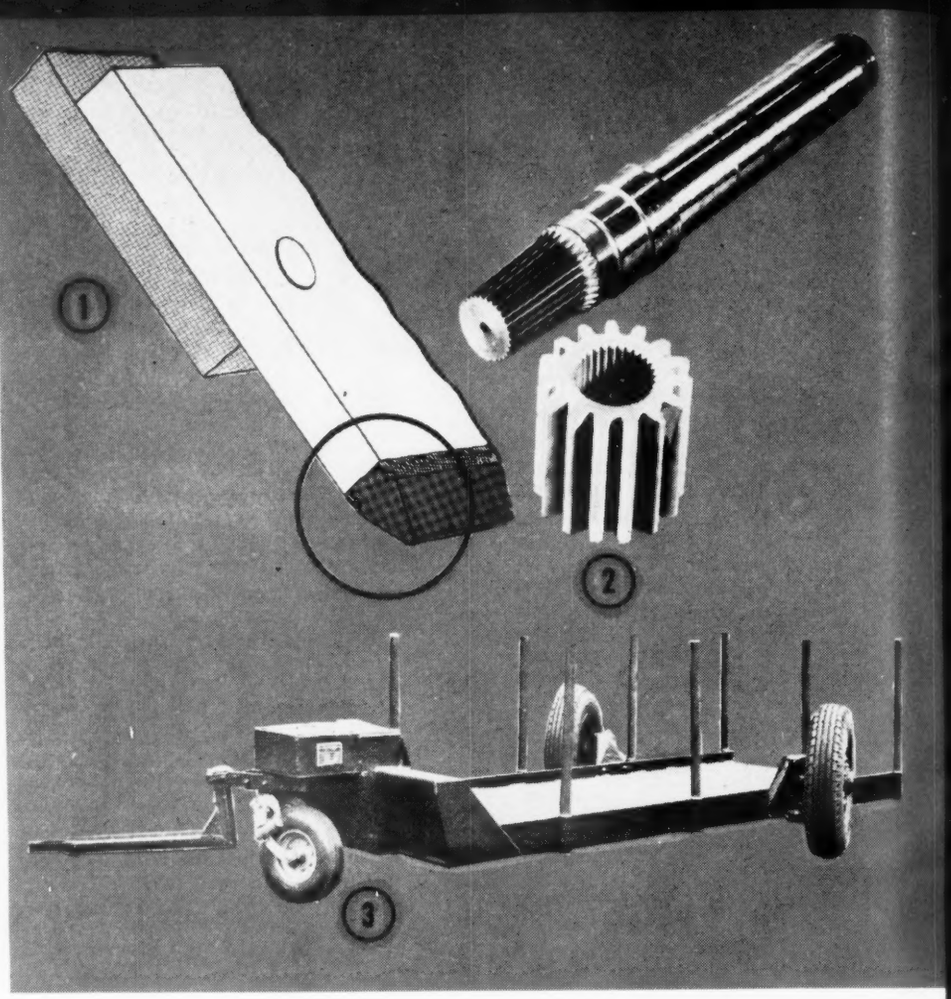
Brown-Fayro Co., Johnstown, Pa.—Locomotive blowers.

The Buda Co., Harvey, Ill.—Heavy-duty mechanical and hydraulic jacks.

Cesco Mfg. Co., Homestead, Pa.—"Cesco" pneumatic and hand chisels.

Chesapeake & Ohio Ry. Co., Cleveland, Ohio—Shipping service for the mining industry.

Cities Service Oil Co., New York—"Pacemaker" T-Series compressor oils, "Trojan" and "Coolmotor" gear and motor oils, "Trojan" greases for mining machines and "Cisco" compound 5-Z for open gears and wire rope.



Allied Steel Products Co. "Re-Nu Edge" for bulldozer blades (1); Pittsburgh Gear & Machine Co. tapered serrated shaft and pinion (2); Fletcher supply trailer (3).

Cleveland Worm & Gear Co., Cleveland, Ohio—New "Speedaire" fan-cooled worm-gear speed-reducer unit available for various ratios and motor applications. The cooling of the unit greatly increases the rate of transfer of the heat generated during operation and permits use of units in smaller sizes than heretofore possible in standard worm-gear units, according to the company. The new "Speedaire" also is said to cost materially less per dollar of horsepower transmitted.

Coal Mine Equipment Sales Co., Terre Haute, Ind.—Rebuilt and used coal-mining equipment.

Coffing Hoist Co., Danville, Ill.—24-lb. 1-ton-capacity hoist jack for general purposes, said to actually lift instead of push, and a new "Midget Puller" weighing but 6 lb. but having a capacity of 600 lb. for general shop, utility and maintenance use.

Other items on exhibit included a full line of Coffing safety-pull ratchet-lever hoists ranging from ¾ to 15 tons; half-ton "Quick-lift" electric hoist and a cut-away of the "Senior Series" electric hoist showing Perry gear reducer.

D-A Lubricant Co., Inc., Indianapolis, Ind.—D-A diesel oils, greases and lubricants for underground and strip-mining machinery.

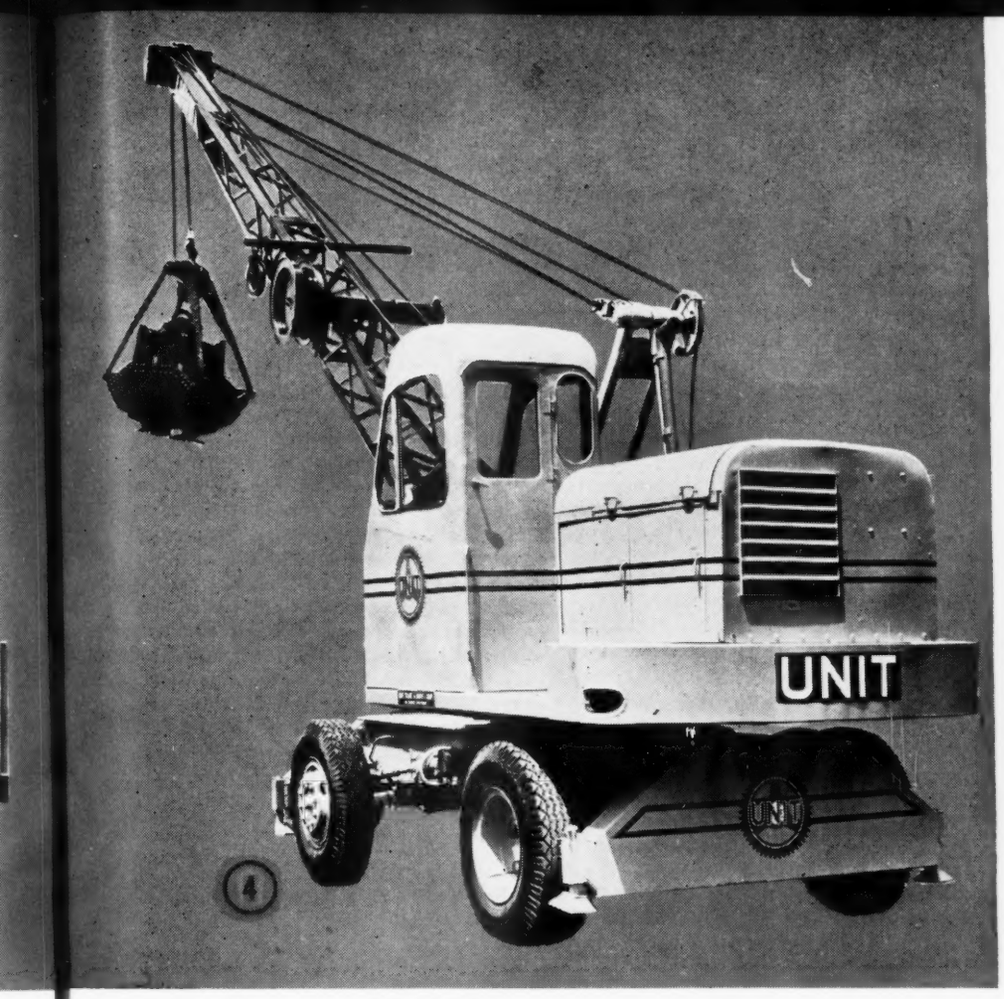
Dow Corning Corp., Midland, Mich. —Silicone lubricants; comparison of a silicone lubricant and a comparative organic lubricant tested at 175 deg C.

Duff-Norton Mfg. Co., Pittsburgh —Complete line of jacks, including 5-ton automatic-lowering machine jacks with reinforced housing and improved spring mechanism; the No. 2528 geared governor-controlled self-lowering jack; a steamboat-ratchet jack; No. B2525 geared ball-bearing machine jack; a series of six types and sizes of automatic-ratchet jacks; low-height heavy-duty jacks in capacities of 15, 25, 35 and 50 tons; No. 5 pinion puller; push-and-pull jacks; and hydraulic jacks in capacities of 3, 5, 8, 12, 20, 30 and 50 tons.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.—Poster display of du Pont Monobel AA and Lump Coal C permissibles, Nitramon for strip-mine blasting, electric blasting caps and No. 10 twist blasting machine which is now permissible; new du Pont blasting timer for split timing of shots (*Coal Age*, March, 1947, p. 144); new-type Nitramon welded can, said to be air-tight and waterproof and especially designed to ride over cuttings and facilitate loading of larger unit charges; "Quick-Seal" tamping plugs for tunnel work now manufactured by du Pont.

Electric Railway Improvement Co., Cleveland, Ohio—"Erico" rheostats and welding accessories.

Farval Corp., Cleveland, Ohio—Farval centralized lubricating system



Unit Crane & Shovel Corp. material-handling unit.

that provides a positive mechanical method of delivering from one central station oil or grease under pressure to bearings on mining machines, preparation plant and other machinery, reducing bearing wear and machine shutdowns.

Fiske Bros. Refining Co., Lubriplate Division, Newark, N. J.—"Lubriplate" lubricants, including the new 630-AA extreme-pressure lubricant for open gears and other general lubrication where extreme pressures are encountered; characteristics cited by the maker include high resistance to water and a melting point of over 400 deg. F.

Flood City Brass & Electric Co., Johnstown, Pa.—Replacement parts for pumps, locomotives and mining machines.

Fulton Bag & Cotton Mills, New York—Tamping bags in regular and waxed paper.

Gates Rubber Co., Denver, Colo.—New "Super Vulco Rope," said to allow for underdesign of drive and thus offer larger horsepower-carrying capacity than the usual V-belt. The concave-sided belt is oil-, heat-, and static-resistant, according to the company.

Gulf Oil Corp., Pittsburgh, Pa.—New Mining Machine Lubricant B (*Coal Age*, March, 1947, p. 144); new Gulf E. R. lubricant designed for gear drives, all types of speed reducers and inclosed gears, featuring non-foaming and extreme-pressure characteristics.

Hercules Powder Co., Wilmington, Del.—Pictorial display featuring Hercules gelatin permissibles and permissible powder for underground blasting; Gelamites and Hercomites for stripping.

Hulburt Oil & Grease Co., Philadelphia—Hulburt quality grease for lubrication of mining machinery.

Independent Pneumatic Tool Co., Chicago, Ill.—Thor impact wrench and portable electric saws.

Jeffrey Mfg. Co., Columbus, Ohio—Jeffrey replacement parts.

Johnson-March Corp., New York—Bottle samples of concrete curing, hardening and water-proofing materials.

Joyce-Cridland Co., Dayton, Ohio—Standard line of 5- to 100-ton mechanical jacks; Joyce "Liftmaster Nu-Hydro" 3- to 30-ton hydraulic jacks featuring a drop-forged base.

Kensington Steel Co., Chicago—"Oro Kenkrome" chains for preparation plants, "ORO" crusher segments, bucket teeth, treads, rollers, sprockets and other replacement parts in various metals for preparation, mining and stripping equipment.

Lee-Norse Co., Charleroi, Pa.—Lee-Norse grease truck (*Coal Age*, April, 1947, p. 95).

A. Leschen & Sons Rope Co. St. Louis—Leschen "Red Strand" wire rope for mining service.

Lincoln Engineering Co., St. Louis, Mo.—Operating display of Lincoln "Centro-Matic" lubrication system for centralized lubrication of tipple, preparation-plant and mining machinery. Lincoln hand- and power-operated grease guns, drum and bucket pumps, lubrication fittings, etc.

Link-Belt Co., Chicago—"Electrofluid" drive (*Coal Age*, December, 1946, p. 174), ball and roller bearings and pillow blocks, mechanical-power transmission equipment, including silent chains, roller chains, steel chains and V-belts, inclosed-gear drives, conveyor idlers and parts and other power-transmission and conveying facilities.

Macwhyte Co., Kenosha, Wis.—Monarch "White-Strand" wire rope and swaged fittings for wire rope and slings.

Martindale Electric Co., Cleveland, Ohio—Equipment, tools and testing instruments for electric-motor repair and maintenance.

Mining Machine Parts, Inc., Cleveland, Ohio—Items from its line of "Improved" mining-machine parts, including the following new: an improvement on an 8BU loading-machine clutch permitting positive adjustment through the end of the shaft without taking the cover off; 14BU crawler drive chain made up of drop-forged block lengths, 5/16-in. side bars and ⅝-in. pins, minimizing failures; old-type 14BU crawler chain with a square-headed rivet to prevent turning, thus materially reducing the tendency of the rivet holes to elongate.

Mining Safety Device Co., Bowerston, Ohio—Anchor gear and wheel pullers.

Ohio Machinery Co., Cleveland, Ohio—Union wire rope.

Osmose Wood Preserving Co. of America, Inc., Buffalo, N. Y.—Samples of "Osmose" salts for treating green lumber; samples of preservative "Osmo-plastic" for spot treatments for timber joining; samples of "Cop-R-Nap" liquid preservative for treating dry timber, fabric and cordage; sections showing preservation of wood after eight years of service; and a model of an "Osmose" moisture-conditioning plant for treating mine ties and timber in any stage of seasoning.

Penn Machine Co., Johnstown, Pa.—Replacement parts for mining equipment.

Pittsburgh Gear & Machine Co., Pittsburgh. Pa.—Tapered, serrated shafts and pinions for mine locomotives (see illustration). Tests have shown 50 percent greater strength than ordinary keyed pinions, according to the company, which states that these new-type shafts and pinions will be available in six months for any mining machinery. Also exhibited was the company's line of replacement gears and parts for loaders, locomotives, shuttle cars and other mining equipment.

Portable Products Corp., Pittsburgh, Pa.—New "Femco" shot-firing device; has 120-volt battery-charging condenser, which develops upwards of 2-amp. current for multiple firing of as many as 10 holes. Indicator light

shows when condenser is charged, and the electrical circuit is said to be completed in 10/10,000 second so that all current is through the wires before the blasting cap can explode, thus preventing secondary explosions. Also displayed in operation, "Terrier" stemming mixer and extruder.

Pure Oil Co., Columbus, Ohio—Mine lubricants.

John A. Roebling's Sons Co., Trenton, N. J.—Pictorial display of Roebling wire rope, wire-rope fittings and wire-rope and grommet slings.

Safety First Supply Co., Pittsburgh, Pa.—"Packo" portable oxacetylene cutting outfit.

Shell Oil Co., Inc., New York—Shell lubricants, including four new products; a loading-machine grease featuring high adhesivenesss, high resistance to heat and water repellancy; "Cardium Compound XX," a waterproof gear-shield lubricant with excellent adhesiveness, high plasticity and long service; Shell compressor oil particularly designed for portable and stationary air compressors; and "Tellus" oil for hydraulic systems, said to provide superior oxidation stability to prevent rust and corrosion, and to have a high viscosity index.

Snap-On-Tools Corp., Kenosha, Wis.—Mechanic's hand tools for machinery maintenance and repair; specially built tools made to customer's order for specific purposes; Snap-On "Torgometer" for testing tension on crankshaft and camshaft, bearings, bolts, etc., to assure uniformity and reduce breakage of studs and bolts and excessive wear of bearings.

Socony-Vacuum Oil Co., Inc., New York—Pictorial display of "Gargoyle" oils and greases for mining equipment.

Standard Oil Co. of Ohio, Cleveland—Samples of mine lubricants.

Standard Oil Co. (Ind.), Chicago—Mining lubricants, technical lubrication service and heavy-duty motor oils.

Stewart-Warner Corp., Alemite Division, Chicago—"Alemite" lubricating equipment, featuring centralized systems for preparation plants, mining equipment and stripping units. The "Lubrometer" was stressed as a means of getting measured application of the lubricant—hand, air or solenoid control, with provisions for tying into a master automatic system with the air or solenoid types. Other features of the centralized system cited by the company include: low cost, positive lubrication, no missing of bearings or over-lubrication and increased production through lubricating while the machine is in operation.

W.O. & M.W. Talcott, Inc., Providence, R. I.—Talcott belt fasteners for conveyor and transmission belts, including the patch fastener for mending ripped or torn belts.

Tamping Bag Co., Mt. Vernon, Ill.—Tamping bags made in both wet and standard-strength papers. The company features a new-type heavy-duty locking nut for crushers, other preparation-plant equipment and all other mining equipment. The nut is split on one side and after application is tightened further onto the threaded shaft by clamping set screws.

Templeton, Kenly Co., Chicago—New Simplex "Jenny," a center-hole-type hydraulic puller for gears, pinions, keys, shafts, bushings and so on in maintenance work. Although only 32 lb. in weight, its capacity is 30 tons, the company states.

Texas Co., New York—Samples of lubricants for all mining machinery; demonstration of "Marfak" grease showing the adhesive and cohesive properties of nine oil lubricants used in the coal industry; lubrication charts for mining machinery.

Tide Water Associated Oil Co., New York—"Tycol" mine lubricants, including the new "Adelbus" diesel series, "Preslube" series of extreme-pressure lubricants for loading machines and similar equipment and the "Latex" series of greases for anti-friction bearings on shovels, tractors and other mobile equipment.

Timken Roller Bearing Co., Canton, Ohio—One-quarter-scale model of a Timken roller-bearing-equipped steam locomotive with Timken lightweight reciprocating parts; also Timken mine-car bearings, seals and closure parts.

Tool Steel Gear & Pinion Co., Cincinnati, Ohio—"Tool Steel" gears and pinions for coal-mining equipment.

Union Wire Rope Corp., Kansas City, Mo.—Wire ropes for deep and strip mining, featuring the new 3x9 slusher ropes. Advantages, according to the company, include: high resistance to abrasion, high resistance to drum crushing, great flexibility and ability to resist shock loads and operate over undersized drums.

Unit Crane & Shovel Corp., Milwaukee—Model of a 357 self-propelled mobile crane for yard work in handling materials. It features a high-type full vision cab (see illustration).

Western Cartridge Co., East Alton, Ill.—Pictorial and sample display of "Big Inch" blasting cap and Western fuse and electric blasting caps.

Safety and Ventilation

American Brattice Cloth Co., Warsaw, Ind.—"Mine Vent" flexible tubing and couplings, ABC jute and duck brattice cloth, including non-inflammable types, and the new ABC non-collapsible tubing for either suction or blowing.

American Mine Door Co., Canton, Ohio—"Mighty Midget" rock-dust distributor.

Cardox Corp., Chicago—The new Cardox "Tramsitank" for fire fighting and the new Cardox mine-fire car (see illustration). The "Transitank" unit is a small, wheeled, carbon-dioxide unit drawn by hand or motorized for fighting fires on the surface or in surface plants. It carries 750 lb. of carbon dioxide. It can discharge at a rate of 300 lb. per minute.

The Cardox mine-fire car, according to the company, includes tanks for 1,500 lb. of carbon-dioxide and 200 gal. of Cardox "Fire Coat," which gels as it is applied, sealing the surface around deep-seated fires. The "Fire Coat" also can be used to construct temporary seals with brattice cloth or other materials. The unit is 13 ft. 8 in. long, 6 ft. 6 in. wide and 40 in. above the rail. Hoses 250 ft. long are supplied for using either carbon-dioxide or gel. It is offered for coal, oil and electrical fires.

E. I. du Pont de Nemours Co., Inc., Wilmington, Del.—"Ventube" ventilation tubing.

Elliott Service Co., New York—Elliott employee bulletin-board service and Elliott Management Information, a weekly bulletin written for department heads, supervisors and foremen.

Farmers Engineering & Mfg. Co., Pittsburgh, Pa.—Femco frequency-modulation trolley phones for mine communication; new Femco battery-operated emergency unit that is completely self-contained and portable for emergency use or can be located in a stationary position to meet mine-telephone requirements.

Fyr-Fyter Co., Dayton, Ohio—New "Instant" mine-fire car (see illustration), a two-tank fire-fighting unit suitable for mounting on a mine car. Karbaloy, the chemical used, is said to provide protection for any type of mine fire except live electrical equipment, to absorb many fumes resulting from a fire and to be readily absorbed by dust, rendering the dust fireproof and harmless. The unit is 22¾ in. high, is equipped with 100 ft. of hose and throws a stream 40 to 50 ft. Also displayed: hand-portable fire extinguishers using foam, Karbaloy and carbon-tetrachloride liquids.

Fulton Bag & Cotton Mills, New York—Non-inflammable jute brattice.

Gates Rubber Co., Denver, Colo.—New Gates "Safety-Stripe" trolley-wire guard (see illustration), a flame-resistant rubber-impregnated fabric that hangs in 4-in. sheets on each side of the trolley wire. An additional 1-in. section turned inward at a 40-deg. angle on the bottom of each sheet prevents any contact with the wire. The guard is said to be easy to install on brackets used on wood and will not injure anyone hitting it. It offers complete protection

against shock, whether wet or dry, and can be salvaged for repeated use. Distinctive diagonal black-and-white stripes make the guard readily recognizable when installed in a mine.

Jeffrey Mfg. Co., Columbus, Ohio—Aerodyne mine fans, featuring the two-stage type; Aerodyne room blowers.

Johnson-March Corp., New York—New cartridge-type "Compound M" for dust control shown with an automatic proportioner for application; Type E proportioner for liquid "Compound M" and a full line of nozzles, solenoid valves and strainers for dust-control systems.

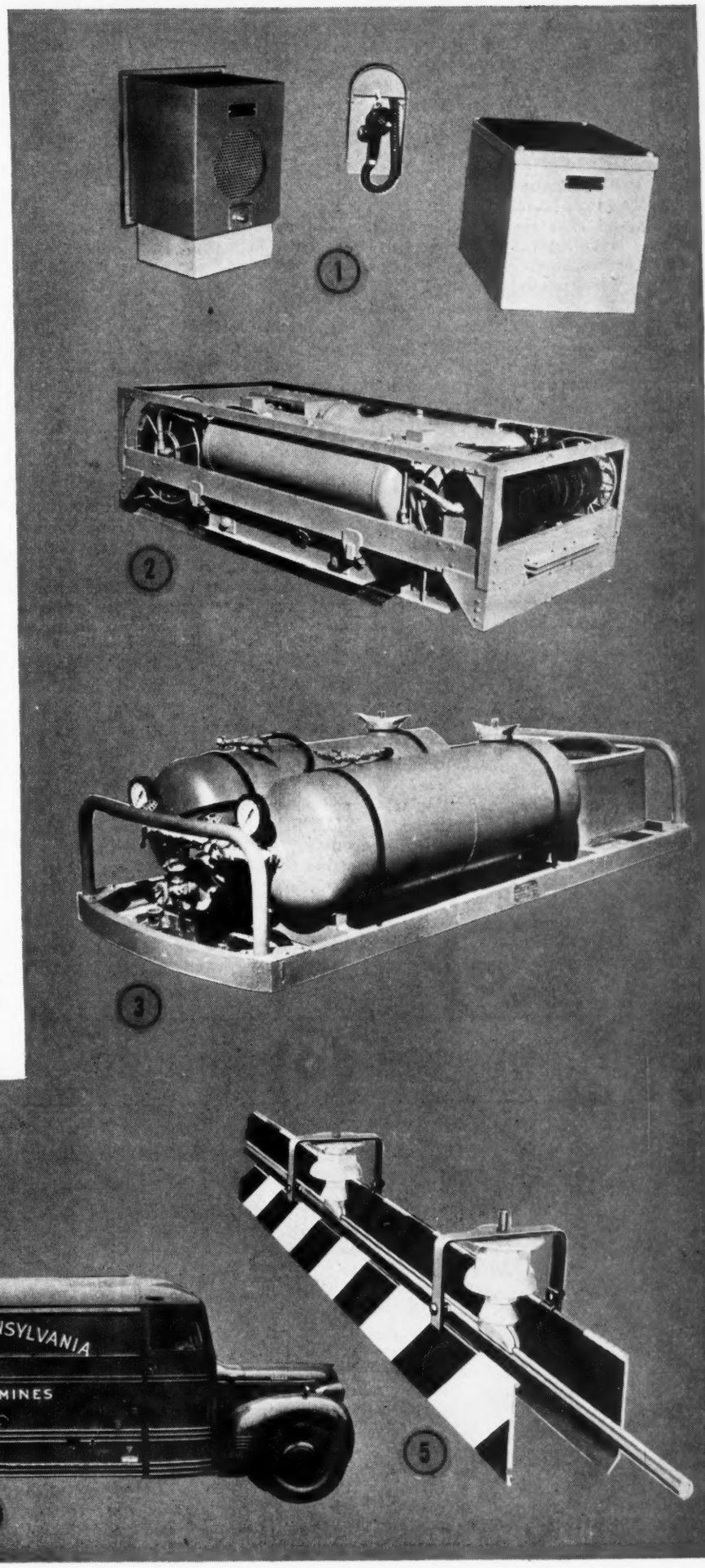
Joy Mfg. Co., Pittsburgh, Pa.—La-Del "Axivane" mine fans, featuring controllable pitch through a new mechanism that changes all blades at once; also "Axivane" portable blowers for auxiliary ventilation.

Koehler Mfg. Co., Marlboro, Mass. — Wheat electric cap lamps and charging equipment, Koehler flame safety lamps and testing units; electric hand lamps for supervisors.

Martindale Electric Co., Cleveland, Ohio — Martindale protective dust masks.

Mine Safety Appliances Co., Pittsburgh, Pa.—Safety equipment for the mining industry, including Wolf flame safety lamps, dust counters, all-service masks, goggles, safety shoes and boots, plastic insoles for footgear, self-rescuers, oxygen apparatus, rubberized protective clothing, inhalators, Edison cap lamps and charging equipment, "Comfo-Caps" and "Skullgards," methane, carbon monoxide and other indicators and alarms, etc.

New items included the "Chemox" self-generating oxygen-breathing ap-



M-S-A induction-current communication equipment (1); Cardox mine-fire car (2); Fyr-Fyter Co. "Instant" mine-fire car (3); Pennsylvania Department of Mines rescue truck (4); Gates "Safety-Stripe" trolley-wire guard (5).

paratus, now approved by the U. S. Bureau of Mines and recommended for storage on the section in mines. The unit makes its own oxygen from a single replaceable canister. For gas detection, M-S-A offered a new methane alarm designed to be placed in the section. It can be pre-set to give an audible or visual signal when the methane content rises to the pre-set figure. It is powered by an Edison battery and uses standard filaments. "Comfo" respirators with redesigned face pieces for better fit and greater comfort were another new offering.

"Bantam" rock-dust distributors in a wide range of models to do specific jobs in accordance with mining conditions were stressed by M-S-A, which pointed out that rock-dusting and the use of rock-dust distributors now is becoming an engineering job. The "Bantam" machines, the company points out, are designed to be moved by any of the forms of transportation found in coal mines.

For better mine communication, M-S-A offered a new communication system (see illustration) developed by the Union Switch & Signal Co. and patterned after the "ITC" (induction-current) system used by the railroads. The new system, according to the company, provides instant and direct communication between dispatchers and all moving locomotives, speeds up transportation, results in more economical operation, promotes safety and makes possible instant reporting of emergencies. It provides, it states, high-quality reception regardless of the number of units.

Morton Mfg. Co., Chicago—Morton suggestion system for making use of employee experience and knowledge.

Peda Spray Co., Inc., New York—Pada Spray equipment for the prevention of athlete's foot.

Pennsylvania Department of Mines, Harrisburg, Pa.—New mine-rescue truck (see illustration), the first of three to be used both for training and rescue work. The truck is a complete mine-rescue station on wheels, containing oxygen-breathing apparatus, gas masks, protective hats, electric cap lamps, gas-detecting instruments, first-aid material, stretchers, inhalator, etc., and complete facilities for servicing the equipment. All equipment is stored in cabinets when truck is in motion and space to carry six stretcher cases is provided. The safety equipment was provided by the Mine Safety Appliances Co. and the truck was built by the Auto Truck Equipment Co., Pittsburgh.

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Pittsburgh, Pa.—"Buronik" fire-resistant trolley guard approved by Pennsylvania and West Virginia.

Safety First Supply Co., Pittsburgh, Pa.—Safety products, including: Wilson goggles and respirators, Portable safety hats, Pyrene fire extinguishers, Quaker fire hose, Justrite safety can, E. & J. Mfg. Co. resuscitator-inhalator-aspirator that eliminates need for body pressure on injured, Scot Air-Pak and Dobbins portable drinking fountain.

Scott Aviation Corp., Lancaster, N. Y.—Scott Air-Pak one-hour, U. S. Bureau of Mines approved breathing apparatus which is self contained and uses air instead of oxygen. Make-ready time is less than one minute and there is but one valve to open, according to the company.

U. S. Bureau of Mines—Mine demonstrations showing the hazards of using defective or imperfect electrical devices in coal mines; a motion picture of coal-dust demonstrations at the experimental mine at Bruceton and a demonstration of explosions of mist from hydraulic-system oils.

Pumping and Drainage

Allis-Chalmers Mfg. Co., Milwaukee—SSHH 2x2-in. "Electrifugal" pump for general-purpose use; also a demonstration of a 1½x1½-in. self-priming mine-dewatering pump with a close-coupled 3-hp. motor.

Armco Drainage & Metal Products, Inc., Middletown, Ohio—Armco welded-steel pipe and fittings, quick coupling portable pipe, "Multiplate" pipe and other drainage products.

Barrett, Haentjens & Co., Hazleton, Pa.—Hazleton portable dip pump strainers, plugs; air-relief, check and dip valves; "CB" and classifier pumps.

Brown-Fayro Co., Johnstown, Pa.—Check and foot valves, strainers and "Austin-Brownie" mine pumps, including a gathering unit featuring total inclosure, flood oiling and anti-friction bearings, plus a clean-out opening on the bottom of the suction chamber.

Deming Co., Salem, Ohio—Deming double-suction horizontal-split-case centrifugal pumps, deepwell pumps, high-pressure water-spray pumps, self-priming centrifugal pumps, side-suction centrifugal pumps with chrome water ends, Fig. 1896 mine-gathering pump with bronze water end, the new Fig. 3302 portable gasoline-powered self-priming pump and the new Fig. 3032 self-priming centrifugal pump in 1½- and 2-in. sizes (others to come). The latter unit, according to the company, includes a patented feature that results in practically the same efficiency as with non-self-priming units. When the pump is fully primed, all recirculation automatically stops. No valve is used in the suction line, which permits the pump to wash back the line each time it stops.

Flood City Brass & Electric Co., Johnstown, Pa.—New 50-g.p.m. vertical pump for local mine dewatering.

Gardner-Denver Co., Quincy, Ill.—Close-coupled electrically driven pump, 30-g.p.m., for 160-ft. head. The company also demonstrated a split-case centrifugal pump for mine pumping and general utility.

Gorman-Rupp Co., Mansfield, Ohio—New fractional-horsepower "Handy Pump" especially recommended for safety installations, such as water-spray lines, dust-control sprays on machinery, etc. Powered by a universal motor operating on 110 to 115 volts, a.c. or d.c., the pump delivers 8 g.p.m. at a 40-lb. pressure at heads up to 25 ft. and weighs only 27 lb. Also exhibited were Gorman-Rupp self-priming centrifugal mine-gathering pumps available in cast iron, bronze, aluminum and chrome, and Wisconsin air-cooled gasoline-driven gathering pumps for stripping.

Guyan Machinery Co., Logan, W. Va.—Guyan foot-valve strainers, turtle-back type utilizing a foot valve.

Marlow Pumps, Ridgewood, N. J.—Operating demonstration of a 2-in. Model 25 EM self-priming centrifugal mine-gathering pump; a 3-in. Model 34 EM self-priming centrifugal mine-gathering pump mounted on three 3.00x5-in. pneumatic tires; Model 12 1½-in. Marlow self-priming centrifugal pump driven by a Briggs-Stratton 1½-hp. gasoline engine, and a cut-away model of the 2-in. self-priming pump showing the internal features of the Marlow construction.

Martindale Electric Co., Cleveland, Ohio—New Martindale pipe-intersection compass for marking lines of intersection on any two pipes up to 12 in. in diameter to be joined to each other regardless of angle; said to save both time and material over the usual cut-and-try method.

National Tube Co. (subsidiary United States Steel Corp.), Pittsburgh, Pa.—Steel pipe and seamless tubing.

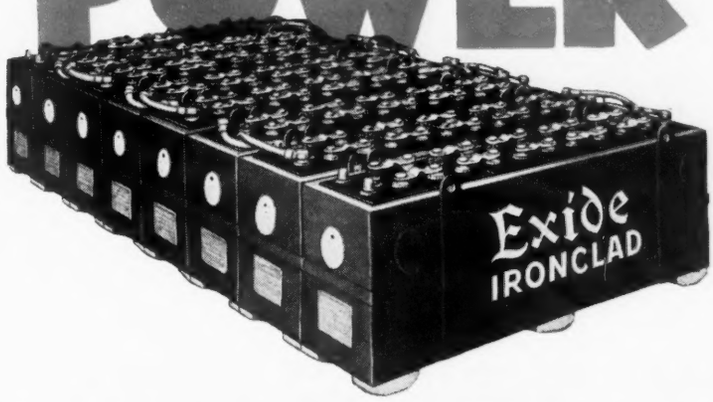
Ohio Machinery Co., Cleveland, Ohio.—Barnes Mfg. Co. pumps.

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Pittsburgh, Pa.—All types of hose, including "Condor" suction hose, said to be damage proof, able to return to shape and non-collapsible.

Safety First Supply Co., Pittsburgh, Pa.—New "Goldak Midget" electronic detector for locating water leaks. The detector is connected either directly or by rod to any accessible point on the pipe and reports the leak by sound through earphones. Weight is less than 2 lb.; also "Goldak" pipe locator for underground pipe.

Victaulic Co. of America, New York, N. Y.—Complete line of Victaulic pipe couplings and full-flow fittings, featuring easy installation and flexibility under pressure; also a tool for making couplings on the job.

SAFE POWER



THEY PULL STRONGER, LONGER, SAFER WITH

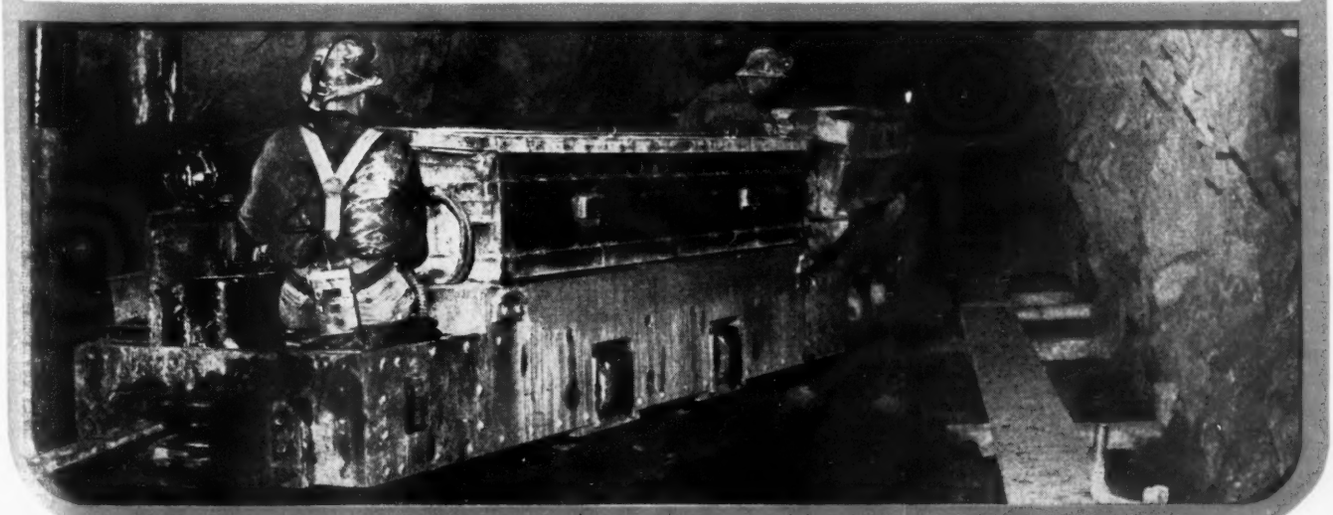
EXIDE-IRONCLAD BATTERIES

Exide-Ironclad Batteries are built to meet the higher power and greater safety requirements in today's mines. That's why more mine operators use Exide-Ironclad Batteries for powering locomotives, trammers and shuttlecars than all other batteries combined.

They have learned that they can count on Exide-Ironclad Batteries for the *high power ability* needed in frequent "stop and go" service... a *high maintained voltage* throughout discharge... a *high capacity* to assure full shift availability... and an *unusually long-life* of dependable performance with greater ease of maintenance.

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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
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The Foremen's Forum

Heat—A Source of Electrical Troubles; What Can Be Done About It

Electricity is regarded as industry's greatest servant and today's coal mine could not afford to be without it. But before we can use it effectively we must know how to handle it—and above all, we must respect it. There is nothing quicker, hotter when loosed or more tricky than electric power. It sneaks across places where it is not supposed to go—to cause short circuits.

Everyone is familiar with what short circuiting the air, by leaving a trap door open, does to a ventilation system. The air simply takes the shorter course and fails to ventilate all the places properly. Short circuits on power systems aren't good either, for they cripple production, account for part of the delays on foremen's reports and generally are costly from the repair standpoint. Short circuits don't give much warning, if any, beforehand and seem to land with a crash to put out the lights and stop the works.

Once a short circuit occurs there is nothing left to do but to mend the damage. If it happens to be a loading machine cable that blew up, very likely every minute's delay is costing a ton of coal. Cable-splicing minutes are so many tons of coal not loaded. On the report, it may leave your loader in the 300-ton column instead of the 400-ton one for that day. Consequently, whatever can be done to prevent short circuits—and short circuits lead to open circuits, both of which are equally annoying from the standpoint of operation — will save you headaches and help your section make a better showing.

Heat is a factor that contributes to both short circuits and open circuits. The rating given electrical apparatus, be it a motor, resistor or cable, is based solely on its ability to dissipate the heat which is generated within while performing its job. When the heat cannot escape, the temperature exceeds the recommended limits and the equipment, along with trying to do its job, proceeds to slowly cook itself.

Mining laws, for years, have prescribed the quantity of ventilation necessary for workers and animals. Nowadays, motors do the work and workers merely operate the controls. Nothing is said as to the ventilation to which a motor is entitled. Of course, more air isn't going to help the motor that is smothering under a foot of dust. A layer of dust does hold the heat and must be removed if the air is to have an opportunity to carry away the heat.

Most trailing cables suffer from too much heat the year 'round. It is always August weather to cables that are wrapped, layer upon layer, on a cable reel. That's why most trailing cables are "burned up" rather than worn out. When cables are used with one or more layers wound on a gathering reel, their current-carrying capacity is reduced as follows: with one layer of cable, 15 percent of its original value; two layers, 35 percent; three layers, 55 percent; four layers, 65 percent.

Since the power demanded by the machine is the same, whether the cable is all or only one-third unreeled, it is easy to see that the cable is greatly overloaded when much of it still is left on the reel. Therefore, the cable for a track-mounted cutting machine, for instance, will give much better service if it is reeled out while the machine actually is cutting. It shouldn't be coiled up in one spot on the ground, but strung out. On loading machines, where the practice is to drag the cable, some operations provide for hanging the cable in big loops where the air can readily get to it. Air carries the heat way and holds operating temperatures in check.

Another source of heat is poorly made machine splices. Most splices are made too hurriedly and often turn out to be poor jobs. Here are a few simple suggestions to bear in mind when you supervise or help to make a cable splice:

1. A splice should be clean.
2. All the strands should be effectively used in making the splice.
3. Contact pressure between the strands joined together should be good and must remain good, which means that the splice must be strong mechanically.
4. The individual conductors and the splice as a whole must be adequately insulated. There isn't much gained by hurrying a splice too much if it causes it to blow up in a couple of days. It's best to do it right. Then you can forget about it.

Heat blows fuses just like it's supposed to, but it also causes them to blow when they shouldn't. Fuses are calibrated to melt and interrupt the flow of power on the basis of line current. A poor fuse installation can cause a 100-amp. fuse to blow on 80-amp. line current. The trouble arises from high contact resistance where the ends of the fuse link are joined to the holder and to the circuit. Unless the connection is clean and unless the necessary clamping pressure is there the connection will heat. This heat travels into the fusible link of the fuse and causes it to melt prematurely.

Fuses are rated as to operating voltage as well as current-carrying capacity. Certain minimum clearances are necessary before the arc accompanying the melting of the fuse link can be extinguished. That's why a 100-amp. fuse for a 600-volt circuit is at least 2 in. longer than a 100-amp. fuse for a 250-volt circuit. Recognition of this fact is important because today better d.c. voltage is

★ ★ ★ ★ ★ ★

What a Foreman Owes

To his company:

1. Loyalty
2. Vigilance
3. Low cost
4. Quality production
5. Waste reduction
6. Full use of machinery
7. Discipline at the face
8. Efficiency

To his workers:

1. Courtesy
2. Patient understanding
3. Impartiality
4. Recognition
5. Operational know-how
6. Supplies at the right place on time
7. Knowledge of company plans and policies
8. Safety

To himself

1. Self-respect
2. Self-reliance
3. Self-improvement
4. Self-discipline
5. Self-criticism
6. Good humor
7. A planned routine
8. Plenty of rest

★ ★ ★ ★ ★ ★

MINE LUBRICANTS

MARATHON

ALL OPERATIONS



CHOOSE MARATHON FOR BETTER MINE LUBRICATION WITH FEWER LUBRICANTS

Simplify the job . . . reduce the chance of error . . . have fewer lubricants to account for and handle. In many leading shaft mines, 4 or 5 Marathon *multi-purpose* lubricants are doing the job—and doing it better—that formerly required the stocking and handling of 10 to 15 specialized lubricants. In many strip mines, 10 or 12 Marathon lubricants are doing the job that used to call for 15 to 20. Worth investigating? You bet.

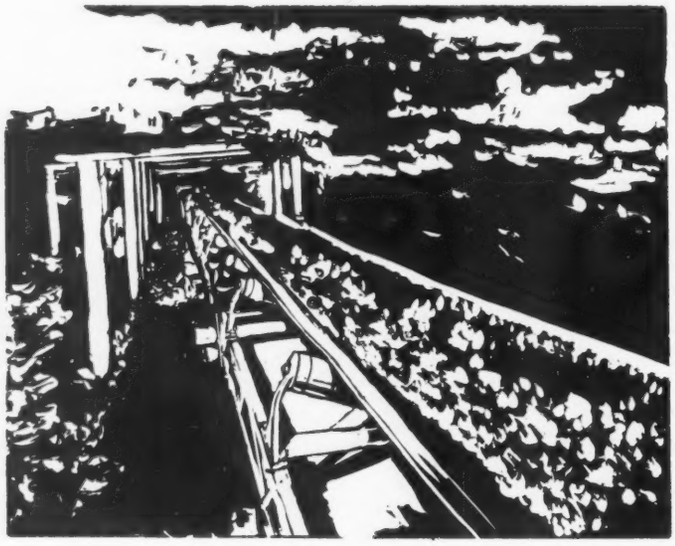
A COMPLETE LINE OF MARATHON LUBRICANTS FOR EVERY OPERATION IN YOUR SHAFT OR STRIP MINE. WRITE, WIRE, OR PHONE . . . ASK FOR A MARATHON MINE LUBRICATION ENGINEER TO CALL AND WORK OUT A COMPLETE MAINTENANCE PROGRAM.

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being maintained at the face. With the face voltage at 250 or above it is essential that fuses have sufficient interrupting capacity to protect the circuit, both as to current rating and operating voltage.

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Conveyor Mining For High Efficiency

By A. J. PUGH
Superintendent, Wyoming mine
Red Jacket Coal Corp.
Wyoming, W. Va.

The first thing to be considered [in conveyor mining] is the pitch of the seam; second, the nature of the roof and bottom; third, the training of key men and crews. The first—pitch of the seam—is primarily an engineering problem. After careful investigation, the layout of the mine is begun. The mine haulageway should be projected to the strike of the seam or slightly to the rise—preferably 1 percent—to favor loaded trips and also to insure adequate drainage in haulageways and air courses.

Multiple-entry systems, with haulage in the middle and return airways on each side of the haulageway and intakes, have proven to be the most successful from a ventilation standpoint, as they eliminate all trap doors and check curtains on main haulageways. Furthermore, such systems require very few overcasts.

Where gathering belt conveyors are used, the room panels should be turned at right angles to the main haulageways. The rooms then parallel the mains and the work is on uniform grades.

The nature of the top and bottom will influence the type of conveyor equipment used and also the face preparation and method of extraction. Should the bottom be rolling and irregular, with a tender-roof condition, the use of chain conveyors probably will give the best results. Where the bottom is uniform and roof conditions are good, shaking conveyors with mechanical-loading heads (duckbills) are recommended, as the only limit to production is mechanical failure and the human element.

The training of key men and crews probably is the most important item of all. Unless both management and employees are in complete accord and sold on the mechanization of the mines, it cannot succeed no matter how ideal or how difficult the natural conditions.

The men chosen for key positions should have the following qualifications: leadership ability, training, tact, character, mining experience, natural alertness and ability to adapt themselves to changing conditions. The training of these men may be accomplished by open meetings with management and manufacturers' representatives to discuss all phases of the operation of machinery and mining systems with which they have contact. They, in turn, train their crews in the installation and maintenance of the various conveyor machines and other equipment.

The success of conveyor mining depends upon good housekeeping, adequate haulageways, proper ventilation, proper alignment of tracks and sidetracks and proper grading. Power units should be kept as close to working sections as possible to insure proper voltage to operate the equipment efficiently. The ultimate success of a mechanical-mining operation depends upon the ability and efforts of the human element throughout the plant. —*The Red Jacketeer.*

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Mistakes Are Foreman's Chances to Move Up

Opportunity knocks every time a foreman sees something wrong—opportunity to strengthen his position with his men and to raise his standing with top management.

The foreman can cash in on these opportunities if he thinks and acts constructively. But if he sees mistakes only as a chance to bawl out his workers or another puzzle to toss on his superintendent's desk, he is missing a good bet for worker cooperation and front-office favor.

First, then, the foreman must see the mistake. That means vigilance. After that, he must find out what will keep it from happening again. That means putting on the thinking cap. What caused the mistake? Was it carelessness? Was it horseplay? Was it ignorance? Was it something wrong with the way the mining plan was laid out? Was the work method wrong?

Thinking out the answers to these questions does two things: (1) it gives the foreman's temper time to cool off and (2) it guides him to his next step.

The second step is a search for a plan that will keep the mistake from happening again. That means analyzing all the factors contributing to the mistake, spotting the basic principle involved and building a detailed plan to keep the mistake from upsetting production again. It should be written down step by step and then reexamined several times to be sure that everything to make it work is included and that it fits into the overall operational picture.

Now the foreman is set to go.

If it was a worker's mistake, it should be taken to him. It is not enough to tell him that he was wrong. He must be told also what is right. There is where the plan comes in, because it shows the worker that the foreman not only knows what the mistake was but also has worked out a remedy. That is the constructive way. It means spending time with the worker and being patient, tactful and helpful. Treated that way, workers soon begin to feel that their foreman is interested in them and in the job. They work better. More coal is mined. The foreman feels better. His record improves.

If it was a front-office mistake, it should be taken to the superintendent. But it is not enough to toss it in his lap and leave it at that. Since the foreman knows the actual working conditions and the cause of the mistake, his superintendent looks on him as the logical person to turn out a workable plan. He expects constructive help. The foreman, then, should be prepared to state the what and where and why of his plan clearly and forcefully.

Perhaps the idea will not be accepted just as it was presented. That is no reason for anger or impatience. Whether his suggestions are accepted or not, the front office knows that the foreman who brings in a constructive plan is a man to keep an eye on, because he is interested in his job and his company. That interest brings approval from top management and a better chance for promotion.



(Patent Pending)

HOLLOW DOWEL TYPE
For Ordinary Service

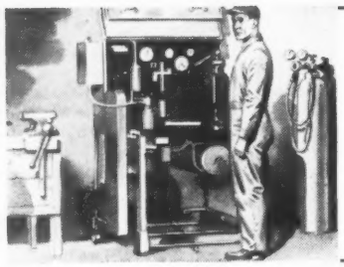
MACHINED GIB TYPE
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ANGLE TYPE
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JEFFREY

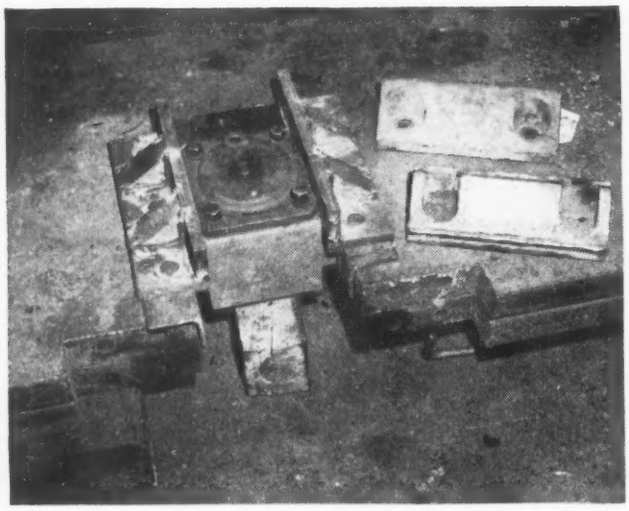
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Complete Line of Material Handling, Processing and Mining Equipment

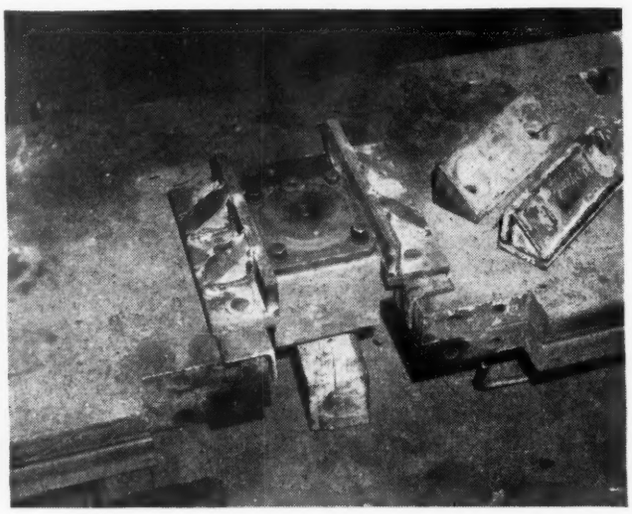


Operating Ideas

Shop Changes Improve Journal Box



How the journal-box assembly appears when presented in the rough.



Three styles of journal-box outside angle guards.

MANGANESE wearing plates and journal-box guards are among improvements in locomotive-journal-box construction reported by John Nicholson, Jr., shop foreman, Drifton Shops, The Lehigh Valley Coal Co., Drifton, Pa.

The journal-box assembly, shown in the accompanying illustrations, has a replaceable angle with one face of manganese steel for wear-resistant qualities, plus journal-box plates with guards attached. It was necessary to take a ¼-in. cut off each side of the side-frame slot and from the underneath side of the plates that retain the journal box to accommodate the additional pieces of angle.

Instead of purchasing new outside steel-casting journal-box guards for the journal boxes, they are fabricated by arc welding. In addition to performing the same job that the old plates did, they form an effective guard to protect the projecting journal-box lids and bolts from any obstruction in the gangways (generally rock and coal) that might otherwise cause serious damage.

Cables On Post Reduce Damage and Fire Danger

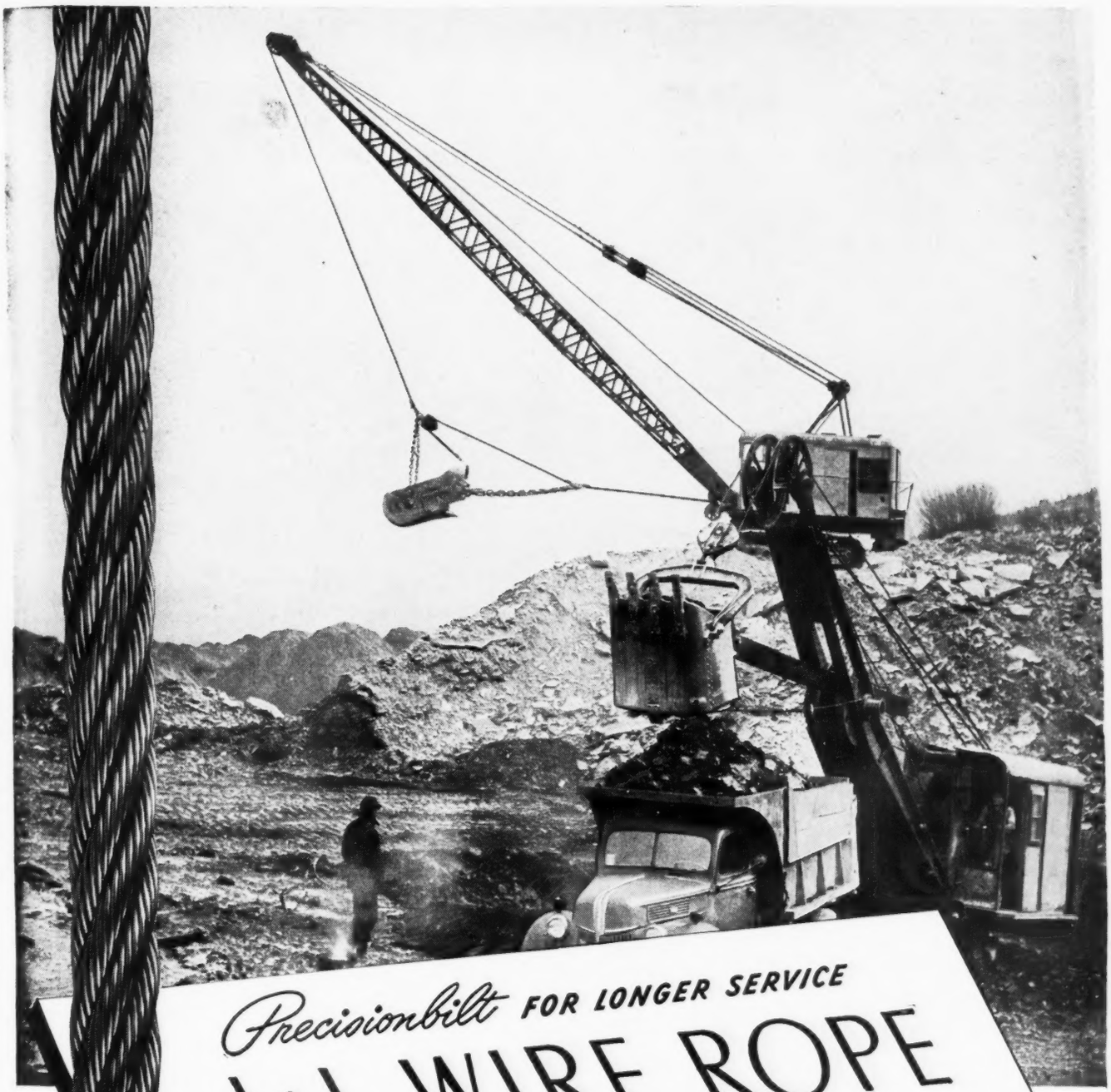


AFTER LONG EXPERIENCE with duckbills in room work, officials of the Rail & River Coal Co., Bellaire, Ohio, have decided that the most practical method of storing surplus room cable and surplus room sprinkler hose is to coil them on cross bars nailed to posts.

As indicated by the photograph, two bars about 2 ft. long are spiked to a post near top and bottom. When a move is made to a new room set-up the cable and hose are coiled on their posts and the whole post moved and re-installed at the next place.

In this mine the 275-volt-d. c. hot side is a single-conductor cable, as is the grounded conductor. By keeping them separated there is no chance of a short circuit as so often happens with multiple conductor cables.

Single-conductor hot cable (left) and fire hose serving face equipment of a room being mined by duckbill. On the opposite rib (not in the view) an insulated grounded conductor is coiled and hung in the same manner.



Precisionbilt FOR LONGER SERVICE

J&L WIRE ROPE

PERMASET PRE-FORMED

J&L STEEL

Dragline and shovel operators reduce down-time on their equipment by use of J&L Precisionbilt Wire Rope. Its extra dependability keeps their equipment on the job, reduces maintenance costs.

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

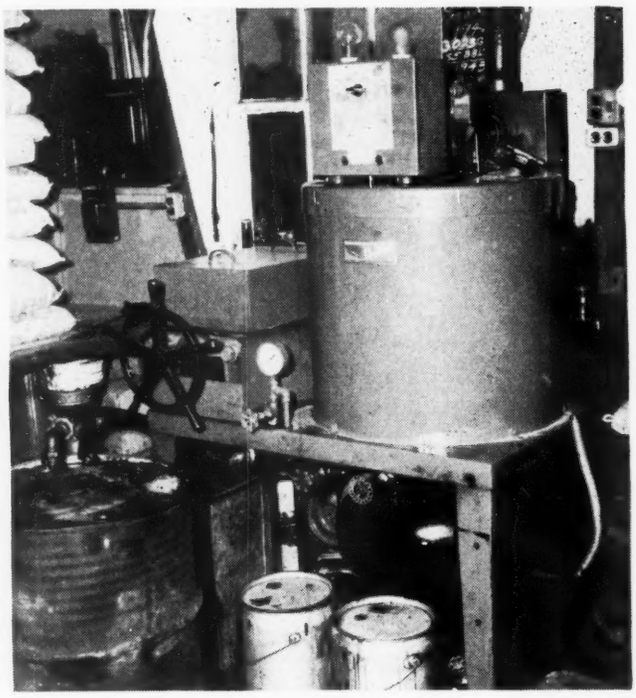
PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

Oil Purifier Salvages Used Oil



Samples of oil before and after treatment are displayed by M. D. Herlocker, storekeeper, Pittsburg & Midway Coal Mining Co.



The oil refiner. Heating vat is at right, filter chamber at left. Electric lights above vat are heat signals.

SIX BARRELS of crankcase and hydraulic oil each week from shovels, draglines and trucks is reclaimed in the supply room of the Pittsburg & Midway Coal Mining Co., West Mineral, Kan., by use of a 17-gal. Y. M. Oil Refiner, Model 17-A, No. 17-23. The purifier, manufactured by the Youngstown-Miller Co., Sandusky, Ohio, operates on 220-volt, 60-cycle, 43-amp., single-phase current. Reclaiming oil is a spare-time job for the storekeeper, who boasts that purified oil is more durable than new oil.

After the grossest impurities have settled out, the used oil is brought to the supply room and poured into the purifier vat. For each gallon of oil, the operator adds one pound of Retrol, a fine diatomaceous earth to which sludge adheres. Retrol is obtained from the Thompson Hayward Chemical Co., Kansas City, Mo.

The refiner agitates the oil and gradually heats it to 430 deg. F. for about 90 minutes, passing off gasoline and other volatile impurities through the stack. Heat cuts off automatically at 430 deg. The oil then is forced by 20-lb. air pressure through a series of filters, where sludge and Retrol are removed.

The new 17-gal refiner reclaimed 3,700 gal. from Sept. to Dec., 1946. Prior to that, an older 6-gal. refiner had salvaged oil as follows: 1941 (6 mos.), 900 gal.; 1942, 3,025 gal.; 1943, 2,915 gal.; 1944, 4,555 gal.; 1945, 4,664 gal.; 1946 (Jan.-Aug.), 4,300 gal.

Blocking Device Proves Effective



This shop-assembled device is used for blocking trips on sidings at the Maiden mine.

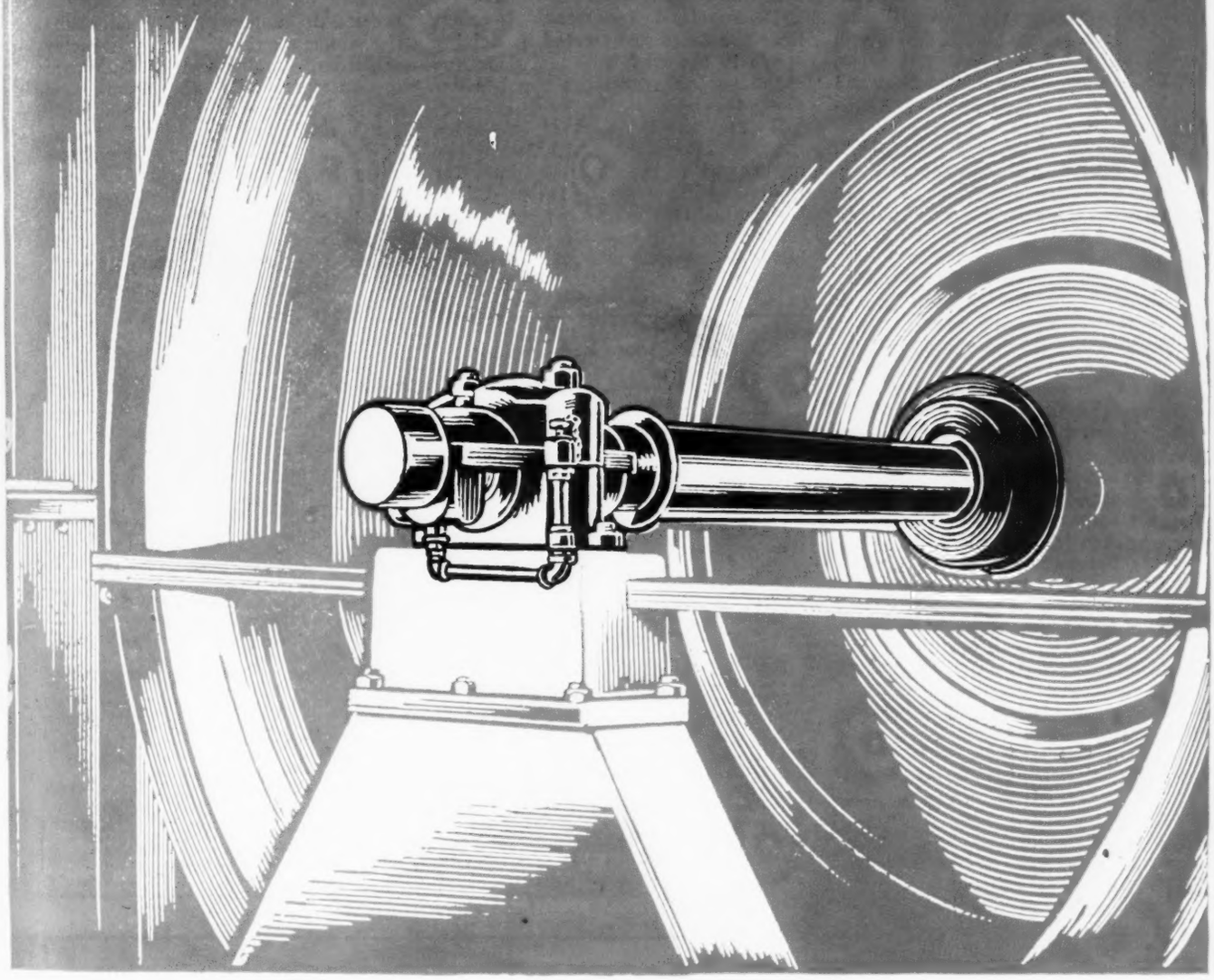
TRIPS ARE BLOCKED on the underground sidings at Maiden mine with a special rail clamp and rope with hook, states Roy R. Brown, superintendent, Maiden mine, Kelley's Creek Colliery Co., Morgantown, W. Va.

The blocking device, displayed by a shop mechanic in the accompanying illustration, consists of a hook with a convenient handle on the back, a short length of wire cable and a clamp for quickly anchoring it to the base of a rail. To attach the device to the rail, the bottom part of the clamp is hooked over the rail base and fastened by driving the lug around the same as in putting in a steel tie. While it is quite simple to anchor the device anywhere along the track, it takes a heavy hammer or sledge to detach it. It is a dependable way to block a trip and holds fast despite the additional bumping of loads.

It Happens

During visits to mines the editors often see operating ideas they consider unusual. When one is pointed out, the reply often is: "That's not new; we've been using it a long time." That is the point—an old idea at one mine can become a new idea at another. So send in your operating or safety ideas. For each acceptable idea Coal Age will pay $5 or more on publication.

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For aid in the selection of Tycol greases best suited for your particular needs, contact your nearest Tide Water Associated office today.

LUBRICATION—"ENGINEERED TO FIT THE JOB"

New Method and Support Cut Bratticing Cost

HANGING BRATTICE CLOTH on spads, using nails for fasteners, has found use in a number of eastern mines, according to a report by Dan Walker and T. J. MacDonald, U. S. Bureau of Mines. J. T. Sembower, Baxter, W. Va., developed the new method and has been granted a patent (No. 2,395,689) on both "the article and the method."

The brattice cloth is supported on case-hardened spads. These tapered spads are made of 10- to 20-gage rolled steel and are 2½ in. long and ½ in. wide at the butt end.

Line brattices are erected by driving a row of spads in the roof at right angles to the direction in which the brattice cloth is to be erected. When all spads are driven, the cloth is stretched over the spads and 8-d. nails are threaded through the cloth and through the holes in the spads. The nails are inserted about 1 in. from the edge of the cloth. This extra inch of material clings tightly to the roof between the spads. A parallel row of spads is driven in the bottom and the bottom of the cloth is fastened in a similar manner. Where the roof has an irregular contour, the cloth is kept against the roof by placing the spads closer together and in the deepest cavities.

Materials used, methods of erection and comparative costs are shown in the accompanying table and illustration.

Several mines have adopted this method of supporting brattice cloth as standard practice. One mine using this method is liberating more than 3,000,000 cu. ft. of methane in 24 hours and it is necessary to maintain line brattice in all places. In the shuttle-car sections of this mine, three-ply airlock check curtains are constructed by this method. Temporary stoppings near the faces are erected by driving spads in the roof, ribs and floor and threading nails through the brattice cloth and holes in the spads.

To expedite the work in this mine, the bratticemen wear carpenter's-type aprons with two pockets, one for spads and the other for nails. A loop is provided on the apron for carrying the hammer. Numerous experiments have been conducted in this mine and the experience gained is said to show that better line brattices are erected by this method, and that they are erected in approximately one-fourth the time required for satisfactory brattices by other methods. The saving on materials in this mine is said to be approximately $100 per entry per year.

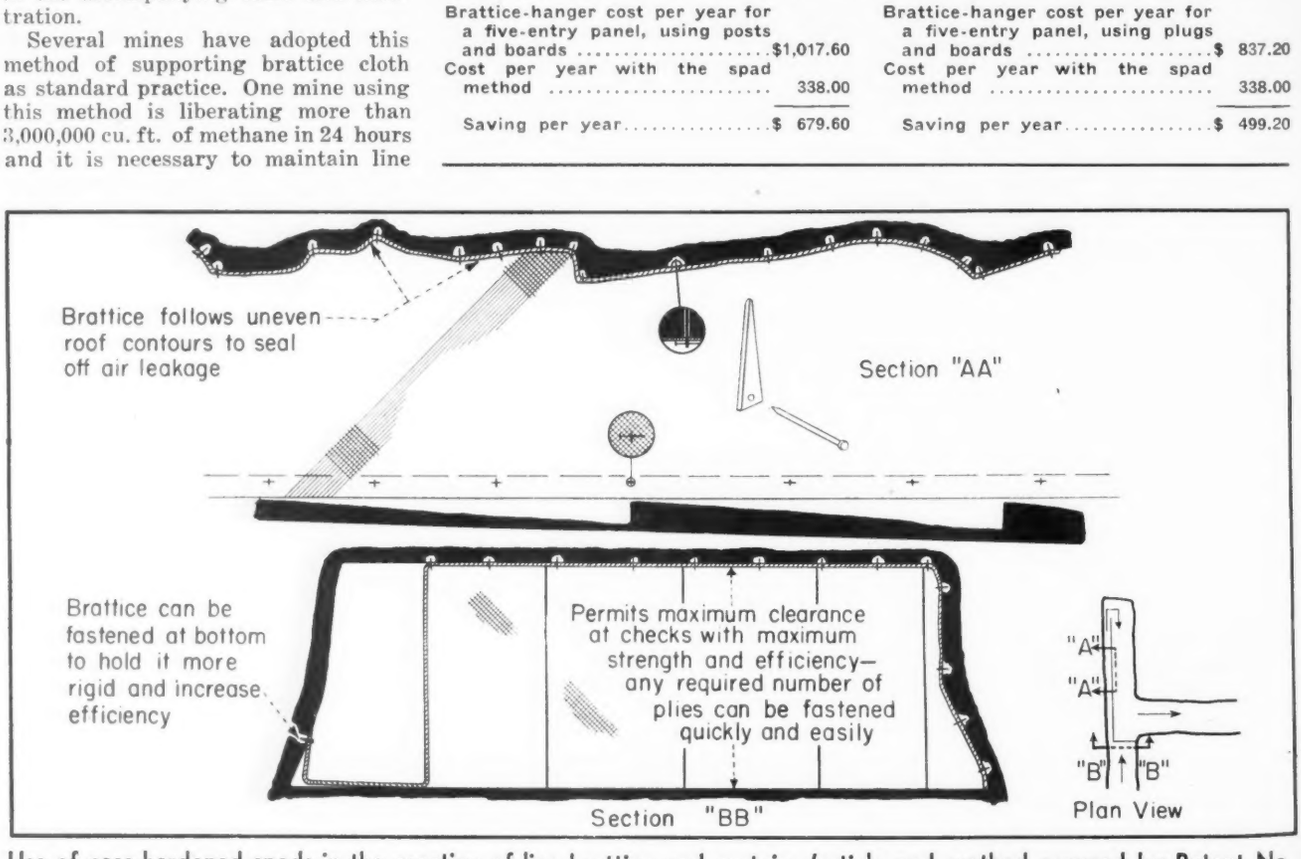
Up to the time this material was gathered, this method has been used in five mines, two in Pennsylvania and three in West Virginia. Each of these mines is working the Pittsburgh coal bed and, in each case, a

Cost Comparison—Erecting 90 Ft. of Mine-Brattice Supports

Boards Supported by Posts		Boards Supported by Plugs in Roof		Spad System	
Six split posts at 15c. each—possible re-use, four times	$0.22	Six wooden plugs at 2c. each	$0.12	45 mine spads at 6.6c each	$0.30½
90 ft. brattice board (45 bd. ft.) at 6.2c. per foot—possible re-use, four times	0.70	90 ft. brattice board (45 bd. ft.) at 6.2c. per foot—possible re-use, four times	0.70	½ lb. nails, all re-usable	0.02
1 lb. nails	0.04	1 lb. nails	0.04		
Materials	$0.96	Materials	$0.86	Materials	$0.32½
Labor cost (by time study)—2½ hours at $1.18 per hour	2.95	Labor cost (by time study) — 2 hours at $1.18 per hour	2.36	Labor cost (by time study)—50 minutes at $1.18 per hour	0.98
Total cost	$3.91	Total cost	$3.22	Total cost	$1.30½

Considering that the average mechanical mine advances at the rate of one crosscut, or 90 ft., per week and that very few panels are less than five entries each, savings by the spad method over the other two methods work out about as follows:

Brattice-hanger cost per year for a five-entry panel, using posts and boards	$1,017.60	Brattice-hanger cost per year for a five-entry panel, using plugs and boards	$ 837.20
Cost per year with the spad method	338.00	Cost per year with the spad method	338.00
Saving per year	$ 679.60	Saving per year	$ 499.20



Use of case-hardened spads in the erection of line brattice and curtains (article and method covered by Patent No. 2,395,689).

A NEW BELT FOR LONG-LIFT CONVEYORS

RAY-MAN CONVEYOR BELT



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THE TENSION-MASTER BELT

ut of the experience and studies of Manhattan's engi-eers and scientists comes this *Tension-Master* Conveyor elt using the super-strength of Rayon. Long recognized as vastly superior strength member in heavy duty truck and quipment tires, Rayon will now score new triumphs in the eld of spectacular long-lift conveyor belt installations.

he Rayon Whipcords in the new RAY-MAN Conveyor elt, with their high tensile strength and fibre resilience, re designed to meet the high tension requirements of the ng-lift belt conveyors.

When you are planning a continuous slope belt operation to replace cars in the mine or open pit, or to replace a series of belts with their costly, troublesome transfer points, be sure to investigate Manhattan's newest development—the RAY-MAN Conveyor Belt, whose Rayon Whipcords are much stronger than conventional strength members and designed for the terrific tension of LONG LIFTS.

Contact your nearest Manhattan representative or write direct for factory engineering counsel on your installation.

Manhattan once more lives up to its tradition — "Keep Ahead With Manhattan" — with a line of conveyor belts that now meets new long-lift conditions in Mining, Quarrying and Construction.

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Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION PASSAIC, NEW JERSEY

portion of the coal is left to form the immediate roof. Tests have shown that the holding qualities of the spads when driven into the coal roof are adequate to support the heaviest brattice cloth.

The obvious and most important advantages of this method are:

1. Well-constructed line brattices can be erected in less time than by conventional methods.
2. The hazards of brattice boards with protruding nails are eliminated and the expense of these boards is avoided.
3. The top and bottom of the line brattice is kept tight against the roof and bottom regardless of the contour, hence eliminating much of the air loss characterizing the conventional methods of erecting line brattices.
4. The bratticemen have with them at all time everything needed to repair check curtains that may have been torn down.
5. Saving of hard-to-get materials.

[Editor's note: In regard to the article and method used in this system of installing brattices, Mr. Sembower states the following:

"I am in the business of furnishing the spad used for this support to the mining industry. To any mine purchasing any or all spads used for this purpose from or through me, I will issue a written release of the patent rights, allowing that mine the free use of the patent. An alternative means of securing the benefits of this brattice support is by the purchase of shop rights, which have been set at $65,000 per mine. The patent is all-inclusive, covering a wedge-shaped plate with any type of hook or slide fastener.

"Because it is possible, as stated before, to purchase spads in the open market that could be used to infringe this patent, I must request the above paragraph be added to any article published."]

Red Light Shows Men Where To Get Off Belt

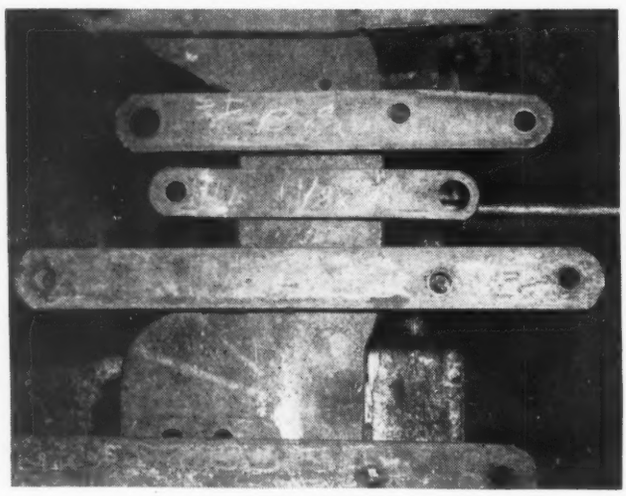


LIGHTS MARK the loading and unloading stations for men riding belts in Lancashire No. 15 mine of Barnes & Tucker Co., Barnesboro, Pa. All belts are section belts and their maximum length is 1,500 ft. Seam thickness is 42 in. and the mining is done with Joy 14BU machines loading into shuttle cars which discharge directly onto the belt conveyors. Eleven men work on a section.

The lights are installed in a single fixture on a post that is set close to the belt and 60 ft. from the loading head where the belt discharges to the mine cars. Looking in by, one sees an illuminated green lens designating the point where he should get onto the belt when it is reversed for carrying in men at the beginning of the shift. Riding out at the end of the shift, one sees an illuminated red lens, which is the warning to unload. Belts operate at 275 f.p.m. and the men get on and off while it is in motion.

Arrow points to lamp on a post. This view, looking toward the loading head, faces the red lens.

Hardened Inserts Improve Brakes





HARDENED BUSHING INSERTS extend the life of brake-rigging parts and improve the mechanical efficiency of the brakes, says J. Nicholson Jr., shop foreman, Drifton (Pa.) shop, The Lehigh Valley Coal Co., in commenting on the shop's experience with them for the past seven years. The illustration at the left shows brake levers with hardened inserts for an 8-ton locomotive, and in the other each style of brake lever is shown with its template on the right. The inserts have a wall thickness of 3/16 in. and are pressed in with a three-thousandths (0.003-in.) fit. The "Redipt" (Duquesne Mine Supply Co.) general-utility hardened bushings used are 1/64 in. larger than the pin diameter.



It's Little But Mighty Important!

We wouldn't know what to do without that little Oliver HG tractor and its Imp dozer. It's little, but it's a mighty important factor in our operations.

Our Oliver "Cletrac" dealer really had the dope when he called it the most versatile unit in the field. He stopped to see us one day and after a look around the location he came up with this: "You know," he said, "I'll bet our little HG with an Imp dozer could solve a lot of problems for you. You can use it to build approach roads, to dig pits, strip overburden, clean off the seam, haul equipment around and a lot of other uses. It's small enough to do a lot of jobs without the high operating costs of a big tractor-dozer unit, yet it packs a real wallop. It can get into places you can't reach with bigger equipment so you can eliminate a lot of hard labor."

That little HG and Imp does everything he said it would *and more.* That Oliver "Cletrac" dealer sure is a helpful man to know.

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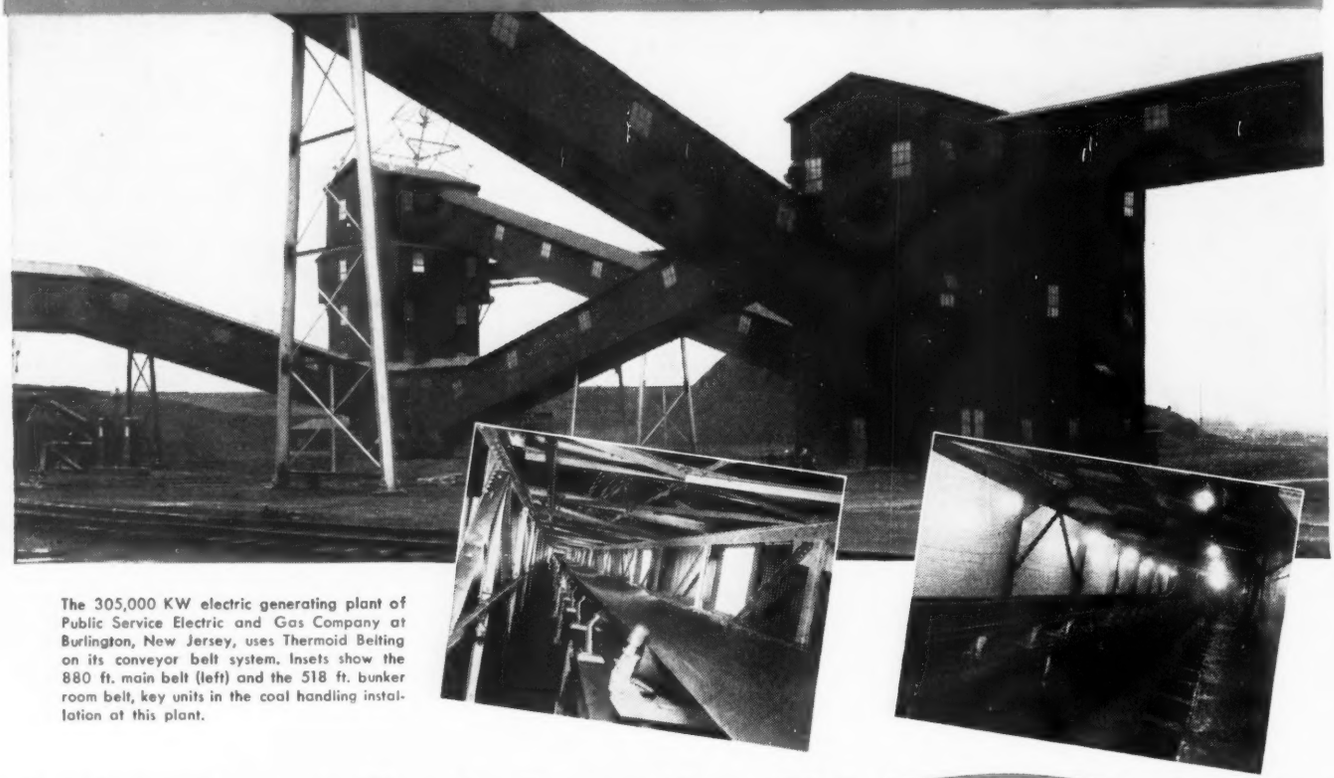
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"THE SIGN OF EXTRA SERVICE"

$35,000 Worth of Conveyor Belting!



The 305,000 KW electric generating plant of Public Service Electric and Gas Company at Burlington, New Jersey, uses Thermoid Belting on its conveyor belt system. Insets show the 880 ft. main belt (left) and the 518 ft. bunker room belt, key units in the coal handling installation at this plant.

An Investment Worth Protecting With Thermoid Quality!

Your Thermoid Distributor can give you delivery dates— on the type of Thermoid Conveyor or Elevator Belting you need.

This generating plant can handle 500 tons of coal an hour on the 3874 ft. of Thermoid Conveyor Belting that equips its unloading and distributing system. This three-quarters of a mile of belting cost $35,000; an investment that must pay off, year in and year out, in terms of maximum tonnage per belt-dollar.

When the Thermoid Trade Mark is on such belting, everyone, from top management down, knows that the Purchasing Agent is buying the best that can be had.

The men responsible for maintaining equipment of this type will be glad to know that through increased production, deliveries of Thermoid Conveyor and Elevator Belting are again predictable and that Thermoid products, carefully made of the toughest materials by skilled craftsmen can now be ordered for replacements long overdue.

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BUILT FOR THE JOB
QUALITY VALUE SERVICE

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Includes: Industrial Brake Linings and Friction Products • Transmission Belting • Light Duty and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose

ard, Harry M. Moses and either Paul L. Shields or I. N. Bayless; for the U.M.W.—Messrs. John L. Lewis, John O'Leary, James Mark, Hugh White, George Titler and Percy Tetlow. Officers, who also are on the committee, are: Ezra Van Horn, chairman; John T. Jones, secretary; Truman E. Johnson, assistant secretary; M. L. Markel, sergeant-at-arms; and Clarence Donaldson, assistant sergeant-at-arms.

Activities elsewhere in May kept the coal industry in the headlines. Speaking in Minneapolis on May 13, former vice president Henry A. Wallace urged nationalization of the coal industry "under some type of coal authority" and asked his audience whether Senator Ball should be able "to use the stubbornness of the coal operators and John L. Lewis as an excuse to cripple the bargaining power of all labor. These people," he continued, "have been nuisances long enough in our economy."

In the courts, the right of the government to recognize a union of supervisory employees in federally-seized mines was upheld by the Supreme Court in a decision announced May 19. The test case had been filed by the Jones & Laughlin Steel Corp. in its fight against being forced to bargain with foremen organized in U.M.W. District 50. The agreement, however, is limited to the period of government operation of the mines.

In Richmond, Va., the U. S. Fourth Circuit Court of Appeals on May 22 ordered Ralph A. Fox, president, the Fox Coal Corp., Morgantown, W. Va., to return his properties to the government. In announcing his decision, Judge John J. Parker, senior judge of the appellate court, reversed the lower court's action and ordered dissolution of an injunction forbidding government operation of the mine. The government had seized the mine last Jan. 5 for "the account and risk of the government" and had discharged Fox as operating manager when he refused to comply with terms of the Krug-Lewis agreement.

As for safety, the U.M.W. announced May 24 the appointment of C. F. Davis, president, District 51, as National Safety Director "to put some diligence behind safety enforcement" in the mines. An advisory board also was named and it was planned to make the new set-up effective upon completion of the current contract negotiations. A union spokesman said the new safety division will try to coordinate all the functions of local safety committees, investigate complaints and attempt to improve safety conditions.

In Springfield, Ill., on May 20, four Democratic members of a legislative committee that investigated the Centralia disaster submitted a minority report assailing Gov. Dwight Green and other state officials for failure to enforce state mining laws.

Coal Activity

Bituminous Coal Stocks

	Thousands Net Tons Apr. 1, 1947	P.c. change From Mar. 1, 1947	P.c. change From Apr. 1, 1946
Electric power utilities	14,059	+ 4.5	—10.4
Byproduct coke ovens	7,429	+11.8	—10.1
Steel and rolling mills	1,141	+15.8	+13.8
Railroads (Class I)	8,262	+ 7.6	—37.5
Other industrials*	18,656	+ 0.4	+ 8.7
Retail dealers	2,127	— 0.2	—32.3
Total	51,674	+ 4.5	—11.7

Bituminous Coal Consumption

	Thousands Net Tons Mar., 1947	P.c. change From Feb., 1947	P.c. change From Mar., 1946
Electric power utilities	6,938	+ 5.2	+35.7
Byproduct coke ovens	8,025	+10.8	+13.0
Steel and rolling mills	947	+ 4.8	+15.9
Railroads (Class I)	10,137	+ 7.5	— 2.4
Other industrials*	15,451	— 1.4	+29.1
Retail dealer deliveries	10,989	—12.4	+33.2
Total	52,487	+ 0.2	+20.2

*Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

April, 1947, net tons	41,120,000
P.c. change from March, 1947	—25.2
Jan.-April, 1947, net tons	205,725,000
P.c. change from Jan.-April, 1946	+18.5

Anthracite Production

April, 1947, net tons	4,268,000
P.c. change from March, 1947	—14.0
Jan.-Apr., 1947, net tons	18,630,000
P.c. change from Jan.-Apr., 1946	—8.4

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Oil Burners
March, 1947	3,425	84,171
P.c. change from March, 1946	—74.4	+218.2
Jan.-Mar., 1947	9,628	227,966
P.c. change from Jan.-Mar., 1946	—77.9	+213.1

Index of Business Activity*

Week ended May 17	191.9
Month earlier	194.8
Year earlier	169.7

*Business Week, May 24.

Electric Power Output†

Week ended May 17, kw-hr	4,615,983,000
P.c. change from month earlier	—0.9
P.c. change from year earlier	+17.2

†Edison Electric Institute.

Fire Sweeps Tipple Near Logan, W. Va.

Fire, apparently originating from welding apparatus, destroyed the tipple, conveyor and headhouse of the Mud Fork No. 15 mine, Island Creek Coal Co., near Logan, W. Va., on May 20. Loss was estimated at $300,000. The day shift had not entered the pit when the fire broke out.

Board OK's Foremen Contracts in Eight Mines

Contracts between the Coal Mines Administrator and District 50, U. M. W., covering supervisory employees in eight seized mines were approved May 16 by a special board appointed by the Secretary of Labor on May 7. The board also approved vacation and vacation-pay arrangements during the annual 1946-47 period to be in effect until the government returns the mines to the owners on June 30, 1947. In making its decision, the board followed the precedent established by the National Wage Stabilization Board on July 30, 1946, in approving a similar union agreement with the CMA affecting supervisors of the Jones & Laughlin Steel Corp. Mines covered by the decision on foremen were the Francis and Berry mines of the Ford Collieries Co., Detroit; Ehrenfeld No. 3, Ehrenfeld No. 8 and Marstellar No. 22 mines of the Pennsylvania Coal & Coke Corp., New York; Nemacolin mine of the Buckeye Coal Co., Nemacolin, Pa.; and No. 1 and 2 mines of the Wendel Coal Co., Wendel, W. Va.

Virginia Commission Rules For Mine Union

Memberships in the U.M.W. are securities within the meaning of the Virginia Securities Law but the union and John L. Lewis, its president, are not guilty of violating the law by "selling" these memberships without the approval of the State Corporation Commission, according to a ruling of the commission handed down April 30. This decision brought to an end more than five months of litigation that began when the attorney for the Richmond Better Business Bureau asked for a cease-and-desist order during the nation-wide bituminous shutdown in November, contending that the union's sale of its memberships without approval of the State Corporation Commission violated state law. However, by laying down the principle that U.M.W. memberships are securities, the commission held the door open for action against any union operating in Virginia and even for further action against the U.M.W., if that union's methods of operating should change.

Mine Explosion Kills Eight in Indiana

Eight of eleven men working in the Spring Hill mine, near Terre Haute, Ind., died after being trapped by an explosion on April 30. Three miners who escaped joined rescue squads in a search for the bodies of the trapped men.

State and federal investigators, after preliminary studies, indicated that violations of the Indiana law and the Federal Mine Safety Code may have caused some of the deaths.

The men in the mine were engaged in safety work, including the digging of a new air shaft, which had been ordered to bring the mine into compliance with federal safety regulations. The mine had been closed by Secretary of the Interior Krug after the Centralia disaster and the repair and improvement work was the only work being done.

Mourning the eight men killed, 900 miners in Indiana failed to report for work May 1, but no extended stoppage was expected.

News Round-Up



Bituminous Talks Resumed in Capital; Southerners Win Separate Conferences

Representatives of operators producing about 75 percent of the bituminous tonnage and the United Mine Workers on May 16 renewed preliminary talks looking to a new contract but few developments were reported as the June 30 deadline drew nearer, when government possession of the mines is due to cease. The Southern Coal Producers Association, meanwhile, announced on May 24 that John L. Lewis had agreed to open negotiations with them on May 28 and Capt. N. H. Collisson, Coal Mines Administrator, ordered 10-day vacations with pay of $100 for miners employed continuously since June, 1946, in the 2,500 government-operated mines. Vacation payments are to be made on the last payday in June, but in no event later than June 27.

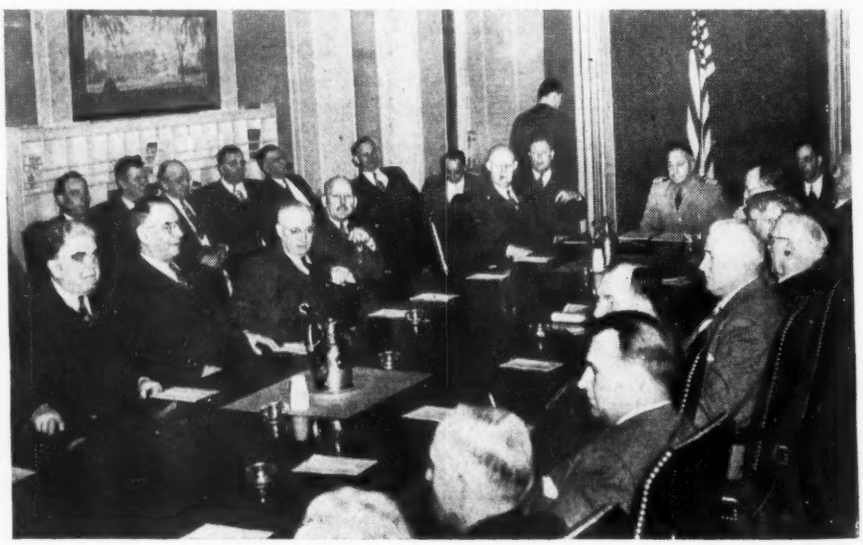
Conferences with the Northern, Western and "captive" operators were reopened in Washington on May 16, after Lewis had consented the day before to abandon, at least temporarily, his demand for industry-wide bargaining. Lewis' decision was announced by Capt. Collisson, who emphasized that the government intends to play a "hands-off" role during the conferences. Little speed was expected in the negotiations until the status of operators and the union is clarified by legislation now pending in Congress to curb industry-wide bargaining, regulate welfare funds, define the status of foremen for collective-bargaining purposes and restore some of management's rights. As the end of May drew near, Senate and House conferees appeared to have reached substantial agreement on the terms of the omnibus labor bill and there was reason to believe the bill would pass both houses with sufficient margin to override a possible presidential veto.

Speculation on the future course of the talks with Northern, Western and "captive" operators suggested that they might last for four to six weeks, bringing them close to the June 30 deadline. Though there was no official announcement of Lewis' demands, the New York *Times* on May 23 set forth what were reported to be his demands as follows: (1) a 25 percent wage rise, which would pay miners the same for a 40-hour week as for the present 54-hour week; (2) a half-hour lunch period "not staggered"; (3) retention of the Federal Mine Safety Code; (4) union control of the welfare fund with two miners and one operator as trustees; (5) inclusion of supervisors in the contract; and (6) other concessions which, added to the direct wage boost, would add 75c. a ton to present labor costs. Neither operators nor union officials would confirm the report.

Prior to the reopening of the conferences after a recess declared on May 6, Capt. Collisson issued a statement in behalf of the Southern operators, making clear their position in requesting separate negotiations. "The Southern Coal Producers," said Capt. Collisson, "also requested that I explain their position to you. Their position is now and always has been in these conferences that they are willing to bargain with the U.M.W. for their constituents. They are unwilling and always have been unwilling during these conferences to sit down and bargain with the rest of the industry. I want to make it clear, at no time have they refused to bargain but they have established the precedent that they would only bargain with the U.M.W. and not with the rest of the operators participating. They have submitted that to Mr. Lewis today. At no time in these conferences has Mr. Lewis refused to bargain with anyone. He has asked, however, because of the rather confusing picture, for an opportunity to discuss it with his Policy Committee and to give the Southern Coal Producers an answer." Following Capt. Collisson's statement, a meeting of the U.M.W. Policy Committee was called for Monday, May 19, but no statement was issued after the meeting.

Earlier, on May 6, operators and the U.M.W. had recessed until May 15, after a government survey indicated that approximately 73 percent of the nation's bituminous tonnage was represented by Northern, Midwestern and Western producers. Southern operators protested that the government figure was too high and claimed instead nearly one-third of the tonnage. In these earlier talks, which began on Apr. 29 at the call of Capt. Collisson, Southern operators had stated their position on the industry-wide bargaining issue.

The Joint Negotiating Committee conferring on terms of a contract between miners and operators in the North, Midwest and West is made up as follows: for the operators—Messrs. Charles O'Neill, George F. Campbell, Harvey Cartwright, Hubert E. How-

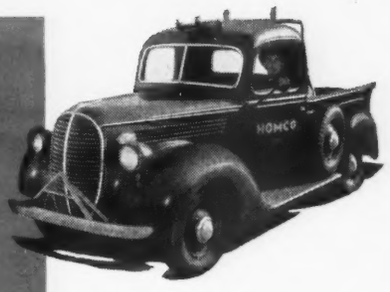


Press Association

U.M.W. representatives (left) and members of the bituminous negotiating committee, as negotiations for a new bituminous coal contract opened in Washington April 29. At the head of the table is Capt. N. H. Collisson, Coal Mines Administrator.

"Certainly FORD TRUCKS LAST LONGER!"

"That's why we operate 207 of them!"—says C. R. Littlepage, Supt. of Transportation, Houston Oil Field Material Co., Houston, Texas.

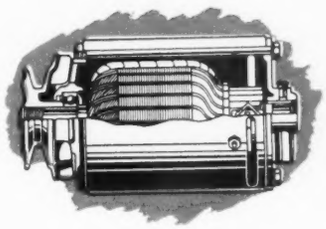


Two 1939 Ford Trucks owned by HOMCO that prove the point: (Above) Driver Joe Zachary and Pickup, mileage 207,316; (Below) Driver H. O. Carpenter and Pickup, mileage 228,398. Supt. Littlepage adds: "Our Ford Trucks deliver trouble-free miles at minimum cost!"



One BIG Reason—

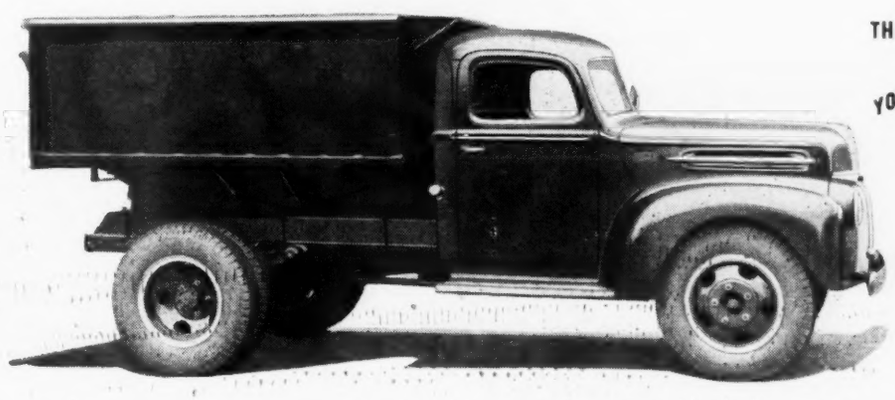
FORD ELECTRICAL UNITS STAND UP!



The fame of Ford Trucks for swift, sure starting and all-weather reliability rests solidly on Ford design and Ford quality . . . in particular, the Ford Electrical System. More than 12 million Ford-designed starter motors and generators have been built in Ford shops. Repeated tests for electrical efficiency consistently prove these fine, Ford-built units to be outstanding. Long, trouble-free generator service is assured by such long-life features as pre-lubricated, sealed ball bearings on armature shafts, and by bushings wick-lubricated from a reservoir with an overflow drain, which prevents surplus oil from reaching commutator. Ford starter motors are pre-lubricated, requiring no oiling whatever. Ford wiring and generous battery and generator capacity adhere strictly to the highest standards of the industry. The simplicity and high efficiency of the Ford starting system circuit, too, have much to do with Ford's faithful starting performance.

Ford

THE 6 YOUR PICK OF POWER THE V-8



Every Ford Truck Dealer can provide a coal delivery body built near-by, on the popular Ford Dump Truck chassis. This one, rated at 3 single or 4 bulk ton body capacity, is by General Body & Hoist Co., Everett, Mass.

Only Ford Brings You All These Long-Life Features: Your choice of engines, V-8 or SIX —each with new Flightlight oil-saving 4-ring pistons and precision bearings · true truck frames in all models, with siderails *doubled* in heavy duty units · rear axle shafts free of weight-load, ¾-floating in half-ton units, full-floating in all others · big, easy-action brakes with non-warping, score-resistant cast drum surfaces—in all, *more than fifty* such endurance engineering features! And more than 100 body-chassis combinations to choose from. See your Ford Dealer now!

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE!

New Developments

• Plans for the opening of three new mines with an ultimate total daily capacity of 10,500 tons have been announced by S. M. Cassidy, president, Consolidation Coal Co. (Ky.), Jenkins, Ky. Work on all three operations, which will have the latest types of mining machinery, bathhouse and other employee facilities and will be planned for the safest possible working conditions, already has been started or will be begun in 1947. The three new operations are the Hendrix mine at Deane, Wright mine at Durham, both in Letcher County, and Hill mine on Pelphrey's (or Burke's) Branch, near Myra, Pike County, Kentucky. (A preliminary and not complete report on one operation appeared in *Coal Age*, April, p.132.)

The Hendrix mine, named for Arthur Kay Hendrix, paratrooper hero of World War II, the first Consol employee to lose his life, will mine the No. 3 Elkhorn seam with an initial capacity of 3,000 tons daily and is expected to ultimately produce 6,000 tons daily. Consolidation is expected to invest approximately $2,000,000 in this new operation and all mining operations will be mechanized and the coal washed. The mine will be served by both the L. & N. and C. & O. The L. & N. is making a 16-mile extension up Rockhouse Creek to serve the operation, at an estimated cost of $2,000,000, and the C. & O. already is building a 24-mile line from Wayland, on Right Beaver Creek, through Beaver Gap to Deane, at an estimated cost of $3,500,000.

The Wright mine, named after John Wesley Wright, well known throughout the area, will be on the C. & O. and will mine the No. 4 Elkhorn seam. It is expected to start coal production this year and eventually will produce 3,000 tons daily. Coal from this mine will be washed on a separate shift at the company's present central preparation plant.

The Hill mine, named for the late Robert C. Hill, first chairman of the board of the Pittsburgh Consolidation Coal Co., is to begin production this year in the No. 3 Elkhorn seam, with an ultimate output of 1,500 tons daily. A 1-mile extension by the C. & O. will be made to serve this operation.

The three mines are not being planned to increase the company's production as a whole, according to the announcement, but mainly to replace tonnage that will shortly be lost because of the gradual working out of the present Consol Mines Nos. 204, 206, 207 and 214. Mine No. 206 is expected to finish this year.

• Purchase by the Peabody Coal Co., Chicago, of the Centralia No. 5 mine, Centralia, Ill., was announced May 15 by Stuyvesant Peabody, president. Mr. Peabody said the company would comply fully with the federal safety code and state mining laws and that he expected that within 60 days the mine would be producing the same tonnage as before the explosion. New miners will be recruited for the operation and the first step in restoring production, according to the announcement, will be to clean up and straighten out the interior of the mine.

• The coke plant at Tacoma, Wash., and coal-mine facilities at Wilkeson, Wash., operated by the Wilkeson Products Co. during the war, have been purchased by Richard E. Randall, Seattle, Wash., for $600,000, the War Assets Administration announced May 12. The coal-mine facilities are understood to have a capacity of about 100,000 tons of coking coal yearly.

• In an attempt to solve the problem of bootleg coal operations, the Girard Estate recently announced that it was ready to consider applications from independent miners for mining of its anthracite properties. According to Morris Wolf, a chairman of a Girard Estate committee, applications must be approved by the Gilbertson Independent Mine's Association and the Veterans' Advisory Council of Northern Schuylkill County, and at present will be considered for those holes that are now being worked.

• The Middle Fork Coal Co., capital $30,000, has been organized at Paintsville, Ky., by A. J. Moore, Daniel B. Howard and Nelson Carlisle. A new operation reportedly will be opened near Prestonsburg, Ky., with a total of 3,000 acres of coal lands available for development in the area.

• Formation of the Lewisburg Coal Co., Lewisburg, W. Va., by Howard W. Vesey, Robert G. Nunn, Jr. and others, with a capital of $100,000, has been reported.

• The Globe Mining Co., Laurel Fork, W. Va., a newly formed organization headed by E. L. Grady, has announced the purchase of the Laurel Creek Coal Co., Laurel Creek, W. Va.; Greenwood Coal Co., Lawton, W. Va.; Laurel Smokeless Coal Co., Kathryn, W. Va.; and the Alaska Coal Co., Beelick Knob, W. Va. The company's mines all operate in the Fire Creek seam in the New River and Winding Gulf districts.

Anthracite Conference Resumes Meetings; Takes Stock of the Future

After five years without a meeting, the Anthracite Conference of Lehigh University held its fifth annual session at Bethlehem, Pa., May 8-9. It covered not only new uses and equipment for anthracite but also rail transportation, distribution, labor relations, safety, mining methods, silt preparation and retailing. Especially new were the extrusion of fine sizes to form burnable pellets and the preparation of silt by wet spiralizing.

After opening remarks by A. C. Callen, general chairman, M. D. Whitaker, president, Lehigh University, discussed the implications of atomic power. Papers and addresses followed through the two-day sessions.

Over 1,000 radiant-heating installations with steam or hot-water piping in floor, ceiling or walls have been made in the United States, asserted H. K. King, service engineer, A. M. Byers Co., Pittsburgh, Pa., with the advantages of invisibility, full use of floor space, cleanliness, reduction of floor currents, summer cooling, reliability, immediate heat after construction, independence of partition location, reduced expense and minimum temperature variation.

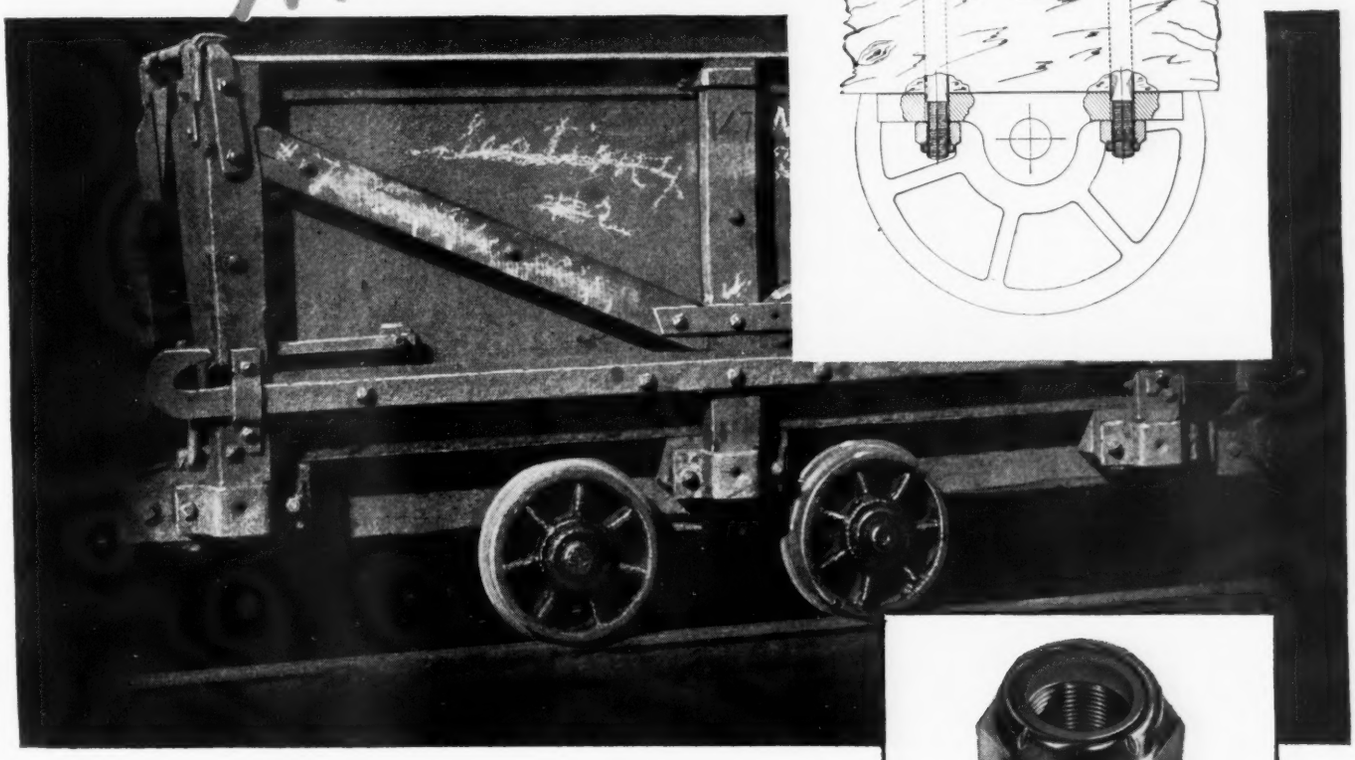
Heat in living space should not heat the body but rather prevent it from losing its self-generated heat, declared H. F. Randolph, Utica, N. Y. Mr. Randolph advocated ceiling heating with forced warm air, which requires no special plaster or ceiling treatment.

Clinker, defined as vitrified coal ash, said C. G. Schantz Sr., fuel engineer, Weston Dodson & Co., Inc., Bethlehem, may form because of insufficient air, unequal distribution of air, excessive draft or burning rate, disturbance of the firebed, changes in rate of burning, a too-thin fuel bed, unequal distribution of coal, presence of fines or presence of foreign elements.

"What happened to the quality of stoker fuel during the war years was, for the most part, unavoidable," stated L. I. Connell, technical director, Stoker Manufacturers' Association, Chicago. "However, its effect lingers on and has unquestionably had a great deal to do with the slow recovery in anthracite stoker sales." Mr. Connell was followed by Dr. R. C. Johnson, vice president, the Anthracite Institute, who pointed out that in the laboratory of the Institute alone, 89 distinct models of the Anthratube have been designed, constructed and tested.

Over-all cost of transporting anthracite from the mines to New York tidewater was found by anthracite producers to be $1.57 per gross ton and by the ICC to be $1.68, declared C. J. Goodyear, traffic manager, the Philadelphia & Reading Coal & Iron Co., Philadelphia. These figures were 83 and 72c. less, respectively, than the average rate that then prevailed. After nine years of multiple litigation, the ICC lowered these rates by 25c. on Aug. 12, 1946. Meanwhile, adjustments on unprepared coal rates enabled operators to build central breakers. Since 1939, however, rate boosts have caused shipments by truck to rise from 6.3 percent of production in 1936 to 14 percent in 1946.

SELF-LOCKING *Reduces Maintenance* ON THE WHEEL PEDESTAL BOLTS



— *the Red Elastic Collar protects against costly breakdowns caused by* VIBRATION!

Detachable fasteners on the wheel pedestal bolts of wooden frame mine cars have two difficult jobs. First, they must hold tight against the violent vibration built up by heavy, hard riding on poor tracks, uneven road-beds and flat wheels. Second, they must maintain their positioned settings on the bolts as the unstable timbers seat and unseat them during the alternating operating cycles of wetness, dryness and freezing.

Fastener failure means derailment, tied-up equipment and disrupted production.

Here again, actual mine tests have proven that ESNA Elastic Stop Nuts—with the self-locking, self-sealing and reusable Red Elastic Collar—hold tight permanently!

Easily removed and reusable ESNA Elastic Stop Nuts provide dependable protection against Vibration, Thread Corrosion, Thread Failure, and Liquid Seepage. Industrial distributors are stocked and ready to serve you. And ESNA engineers are available to study your fastener problems. Address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and Distributors are conveniently located in many principal cities.

LOOK FOR THE RED COLLAR
THE SYMBOL OF SECURITY

It is threadless and dependably elastic. Every bolt—*regardless of commercial tolerances*—impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads—and eliminates all axial play between the bolt and nut.

All ESNA Elastic Stop Nuts—*regardless of size or type*—lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.



ELASTIC STOP NUTS


INTERNAL WRENCHING


ANCHOR


WING

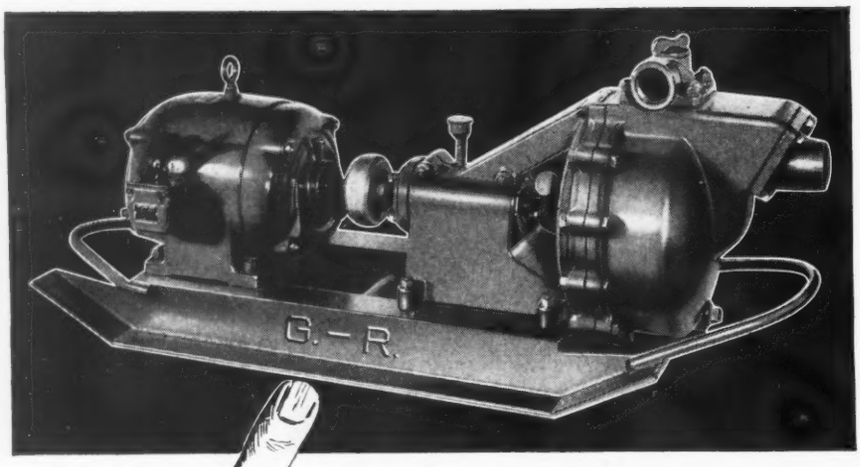

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PRODUCTS OF: ELASTIC STOP NUT CORPORATION OF AMERICA





This Pump needs no nurse maid

Mining requirements are tough. Rugged construction and reliable performance in a mine gathering pump is necessary. They must operate unattended for long periods of time.

Gorman-Rupp gathering pumps are designed to meet such requirements. They seldom need attention and are automatically self priming. They have primed perfectly through 200 feet of dry two-inch suction line. There is no adjustment between prime and run -- no valves or gadgets to rob pumping efficiency.

These pumps will not clog. They will handle any muck, sand or solids that will pass the intake strainer. The impeller, mounted on high grade roller bearings, is the only moving part. When maintenance is finally necessary, any wearing parts can easily be replaced by an inexperienced man with common tools. A quickly renewed wear plate greatly simplifies this operation.

Gorman-Rupp self-priming, centrifugal pumps are the most simple, rugged, *trouble-free units* you can buy and are ideal for automatic or remote control as well as for all regular water gathering service.

For additional information write for bulletin No. 301-46 or contact your nearest distributor.

THE GORMAN-RUPP COMPANY

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Distributed by: Guyan Machinery Co., Logan, W. Va. — Weinman Pump & Supply Co., Pittsburgh, Pa. — McComb Supply Co., Harlan, Ky. — Bittenbender Co., Scranton, Pa. — Industrial Supply Co., Terre Haute, Ind. — Hoe Supply Co., Christopher, Ill. — Central Supply Co., Greenville, Ky. — Ebbert & Kirkman Co., Inc., Birmingham, Ala. — Henszey Co., Watertown, Wisc. — Union Supply Co., Denver, Colo.

Meetings

- American Society of Mechanical Engineers: semi-annual meeting, June 16-19, Stevens Hotel, Chicago.
- American Society for Testing Materials: annual meeting, June 16-20, Chalfonte-Haddon Hall, Atlantic City, N. J.
- West Virginia Coal Mining Institute: spring meeting, June 20-21, Fairmont Hotel, Fairmont, W. Va.
- Mining Society of Nova Scotia: annual meeting, June 26-27, Cornwallis Inn, Kentville, Canada.
- Mineral Producers Association: annual meeting, June 27, William Penn Hotel, Pittsburgh, Pa.
- Smoke Prevention Association: annual meeting, July 7-10, Royal York Hotel, Toronto, Ont., Can.
- Illinois Mining Institute: annual meeting, Abraham Lincoln Hotel, Springfield, Ill., Oct. 31.

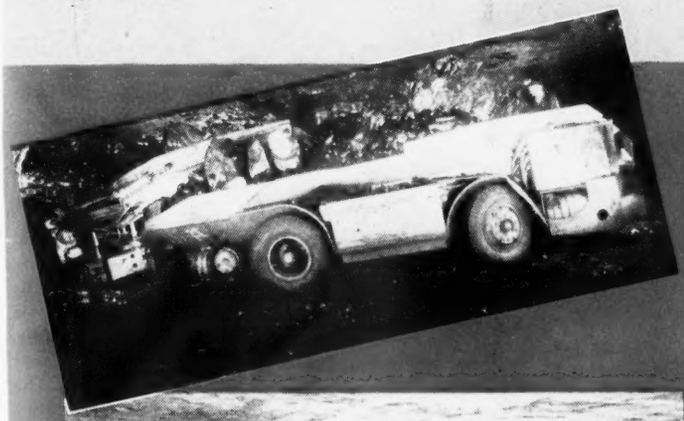
Data on distribution of anthracite between 1916-17 and 1944-45 were reported by J. A. Corgan, chief, anthracite and coke section, Fuel Economics Division, U. S. Bureau of Mines. Declining markets were revealed in New England and the North Central states, growing markets in the Middle Atlantic States, Delaware, Maryland and the District of Columbia, and in Canada.

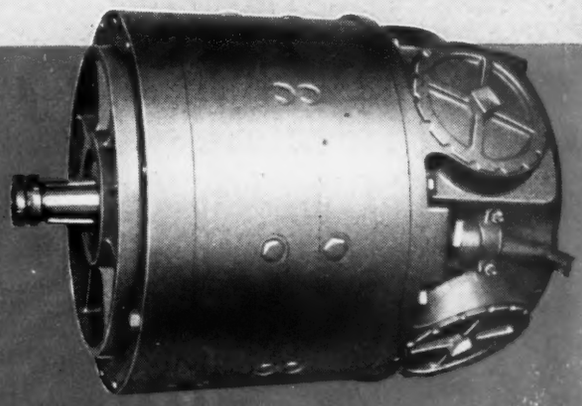
After holding its own as a cupola fuel from about 1850 to 1900, said C. C. Wright, professor of fuel technology, Pennsylvania State College, anthracite was replaced by coke. Yet anthracite's usefulness as a cupola fuel can be measured against several yardsticks, depending upon the requirements of the particular foundry for melting rate, metal temperature, metal quality, fuel efficiency and size of taps. More specific standards for selection of types of anthracite for this purpose are needed.

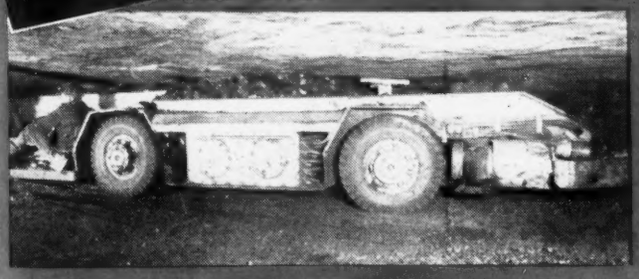
Tests have been made at the Floridan Co.'s plant, Warren, Pa., with a machine for extruding anthracite fines through a "die" to convert them to a fuel of manageable size, explained P. A. Mulcey, director, Anthracite Institute Laboratory, Wilkes-Barre, Pa., speaking for himself and J. W. Eckerd, senior engineer of the Institute. The extruded fines, with a binder of Lignone or Florigel, come out like macaroni. Satisfactory pellets can be made without a binder from culm banks and silt reservoirs that contain occluded clay, Mr. Mulcey continued. Where no binder is used, the pellets in water are subject to degradation and should be waterproofed or protected from weather.

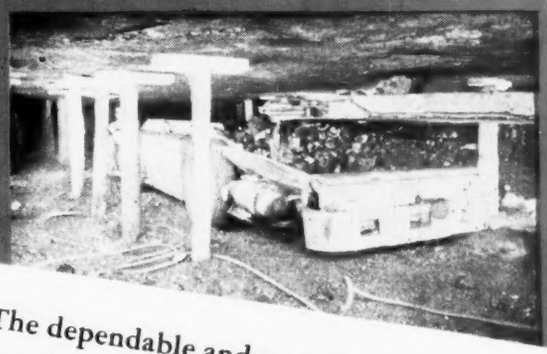
Probable new uses for anthracite were discussed by A. J. Johnson, fuels and combustion consultant, Lansdowne, Pa. Among those he mentioned were tobacco curing, protection of crops from frost, "sintering" or clinkering of the lower grades of iron

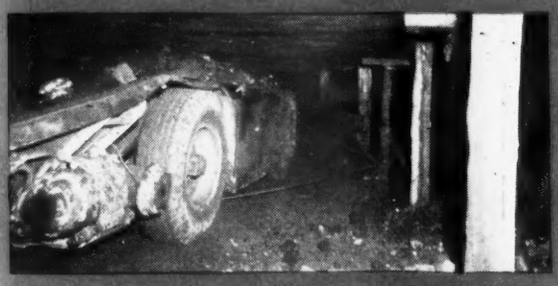
95% of All Underground Rubber-tired Haulage powered by RELIANCE MOTORS













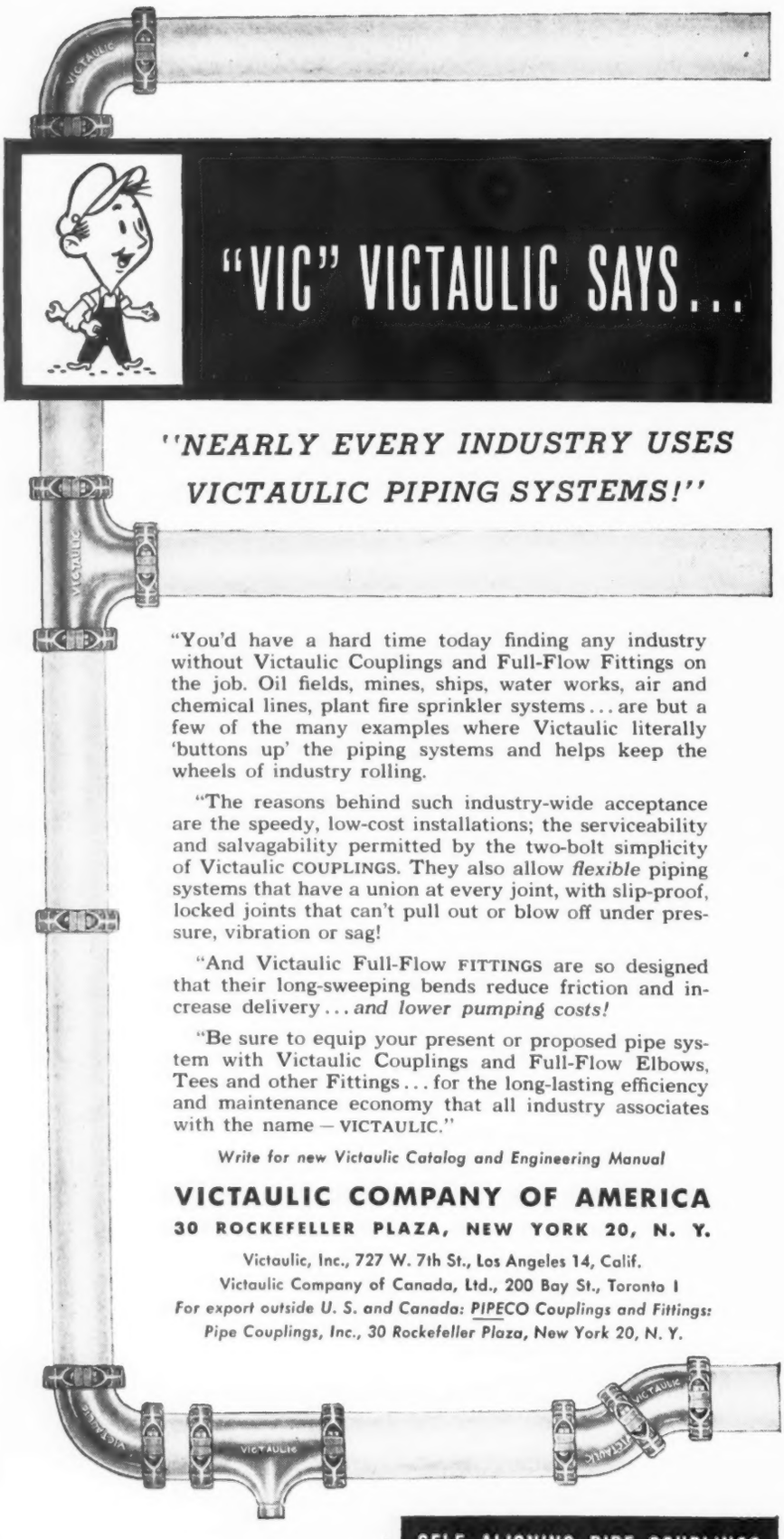
The dependable and economical performance of Reliance-built Motors has made them the first choice of coal operators. Motors built by Reliance power 95% of all underground rubber-tired haulage—helping to keep production up and costs down.

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RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"



ore, manufacture of carbon black and inert fillers for plastics, paint and cement, manufacture of carbon dioxide and many other chemical uses.

By and large, anthracite's grievance-adjustment machinery has produced better labor relations, declared Dr. T. E. Larkin, umpire, Anthracite Board of Conciliation, Buck Hills Falls, Pa. Between 1903 and the present, he said, the Anthracite Conciliation Board has provided that striking men should not lose their jobs, that definite procedures be used for handling grievances, that the terms of the general agreement were to be the basis of settling grievances, that awards should be based on "established practices" and that workers and operators should try to settle their disputes before calling in the Board.

During the last 10-year period, anthracite improved its record of tons per fatal accident 32 percent, weighing the first five years against the second, declared C. G. Brehm, supervisor of safety and compensation, Susquehanna Collieries Co., Nanticoke, Pa. On a man-day basis, the record improved 29 percent. Mr. Brehm described the inspection report forms used by his company and the method of routing, handling and filing them.

To minimize exposure to top falls, the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., drives forepoles in advance of the last set of timber in extending gangways, chutes, headings or pillar holes, said Harry Leidick, safety engineer, who read the paper of G. A. Roos, general manager. If the rock or coal is very loose, side poles or lagging is driven ahead along the rib.

To prepare silt for boiler fuel from a 1,500,000-ton pile at Powderly Colliery, The Hudson Coal Co. is erecting a Humphrey's Spiral plant, said H. H. Otto, assistant general manager for engineering, whose address was the joint work of himself, V. W. Wilson and W. L. Dennen, mining engineers. An article on the plant appears in the feature section of this issue.

To G. H. Israel, service manager, Lehigh Navigation Coal Co., Philadelphia, it seems that retailers should use many of the devices employed in breakers for saving labor and reducing degradation, thereby increasing profits and pleasing customers. G. A. Woodruff, the Woodruff Coal Co., Bridgeton, N. J., reported that nearly a third of his customers request and receive ash-removal service. They pay for it and the company earns "considerable revenue" by selling the ashes.

Competition from other fuels is becoming critical, said J. C. Buch, supervising engineer, anthracite mechanical mining section, U. S. Bureau of Mines, Wilkes-Barre, Pa., who spoke for L. C. McCabe, chief, Coal Division, U. S. Bureau of Mines. Hence, new uses for anthracite and less costly production are essential.

Sure ... THERE'S A DIFFERENCE IN WIRE ROPE—



THAT'S WHY
The BIG Demand is for Tiger Brand!

IMMEDIATE DELIVERY

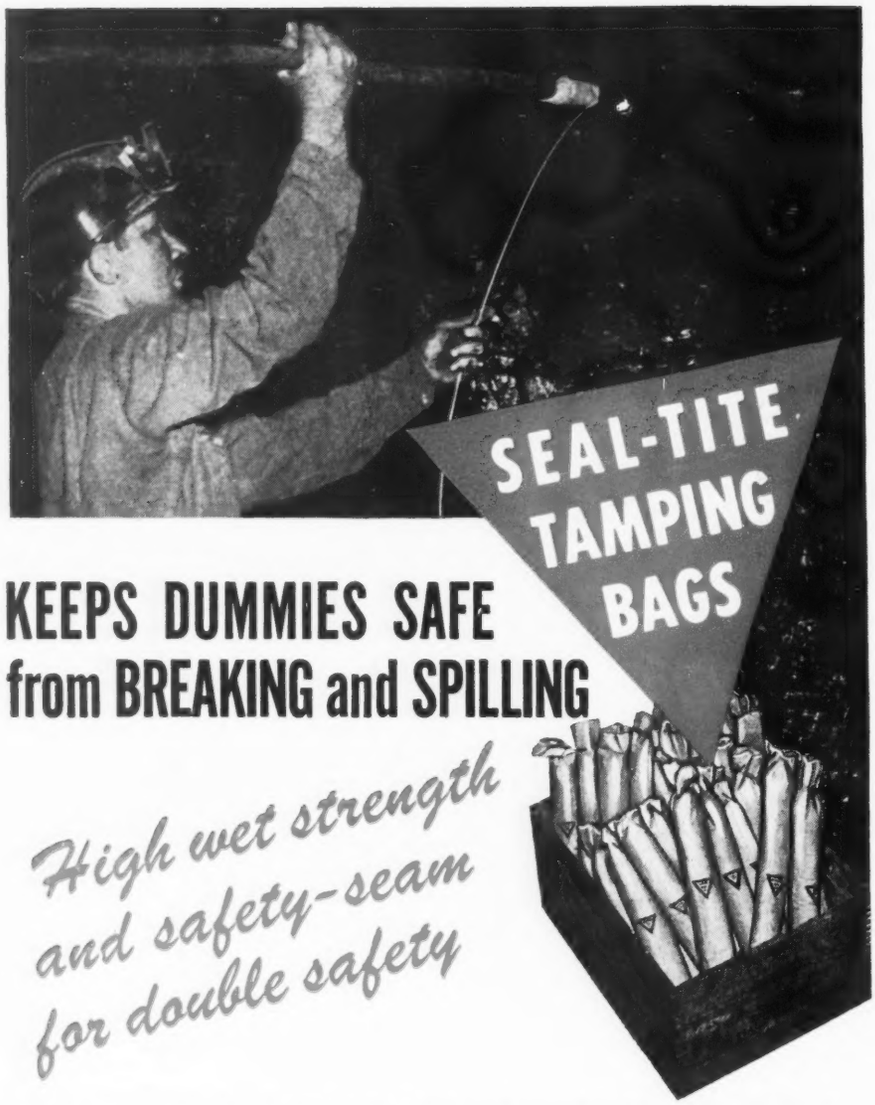
ANY QUANTITY
ALL TYPES AND SIZES

● You know you've got an *extra good* line the minute you rig up with U·S·S American Tiger Brand Excellay Wire Rope. It's easy to handle. And, it has the *stamina* to stand up *tirelessly* under the most gruelling work. It's this ability to "take it" . . . and keep on *taking it*, that makes Tiger Brand the most efficient, most economical line you can use. Put this better wire rope on your equipment and see for yourself why the BIG DEMAND IS FOR TIGER BRAND.



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COLUMBIA STEEL COMPANY
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Tennessee Coal, Iron & Railroad Company, Birmingham,
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UNITED STATES STEEL



KEEPS DUMMIES SAFE
from BREAKING and SPILLING

High wet strength and safety-seam for double safety

Blasting procedure is streamlined with dummies made with Seal-Tite Tamping Bags. Labor, time and cost is reduced . . . A supply of dummies is quickly and simply made up at one time — and stored underground, safe from breaking and spilling—in Seal-Tite Tamping Bags.

Under humid conditions, the *high wet-strength* chemically-processed Sealtite kraft won't tear or break—and the safety-seam won't open.

They're *tough*, too—they can stand the gaff in rough handling.

SEND FOR SAMPLES TO TRY OUT

Of course, you'll want to put them to the test. Send for free samples of Seal-Tite Tamping Bags in the sizes you want or we'll send an assortment of sizes—Just write!



Tamping Bag Co.

212 SO. THIRD ST.
MT. VERNON, ILL.

Anthracite-burning gas-turbine locomotives, the heat pump and smoke-abatement activities should boost the demand for anthracite, he contended.

Russia is not the only country interested in underground gasification, said Mr. Buch. Belgium has isolated old workings near Liege that will be ignited this spring and the Bureau of Mines and the Alabama Power Co. are jointly doing experimental gasification of a 2½-ft. coal bed at Gorgas, Ala. Pitching beds, like those in the anthracite region, favor such utilization.

Five German mining machines have been chosen by Mr. Buch for test in the anthracite region: (1) two Eickhoff shearing machines now at work in an 8-ft. bed on an 85-deg. pitch; (2) a 20-hp. universal Korfmann shearing machine; (3) a Brieden pneumatic packing machine; (4) a rigid-blade coal planer; and (5) a Korfmann pneumatic pick hammer. A scraper-loader machine designed and built by the Bureau of Mines for use in beds from 4 to 6 ft. thick, pitching 50 deg. and over, also has been installed but thus far has been used for rock work only.

Bureau preparation engineers soon will begin installation of a cyclone cone as a clarifier at cleaning plants, Mr. Buch added. Gasification of anthracite and derivation of chemicals from the gases also will be studied.

At the banquet, F. W. Earnest, president, the Anthracite Institute, presided. C. M. Dodson, president, Weston Dodson & Co., Bethlehem, Pa., and J. B. Warriner, president, Lehigh Navigation Coal Co., Philadelphia, spoke briefly. Con McCole, mayor of Wilkes-Barre and director, The Hudson Coal Co., made the principal address.

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Seek to Improve Safety Code Enforcement

"Constant improvement in enforcement measures is necessary in order to achieve the results we all seek," said Captain N. H. Collisson, Coal Mines Administrator, in answer to questions asked him May 2. Citing a total of approximately 24,000 corrections of items of non-compliance with the Federal Mine Safety Code during the period of government possession of the bituminous mines and about 15,000 corrections made between passage of the Federal Mine Inspection and Investigation Act in 1941 and seizure of the mines in 1946, the Administrator pledged close cooperation with the Bureau of Mines to expedite enforcement of the code. No changes in the code are contemplated at present, he said.

Under procedures recently authorized, Capt. Collisson stated, the Federal Bureau of Mines inspector is given authority to direct immediate compliance on certain items wherein immediate compliance can be accomplished, and authority to direct the

Pangborn Makes Coal Dust Behave



Desire for increased safety and improved working conditions—lower-cost equipment maintenance—efficient coal dust disposal and reclamation—elimination of nuisances—is responsible for the large number of Pangborn dust control installations in coal preparation plants.

For many years a "Pangborn" has been the recognized method of effectively collecting the fine coal dust that is produced in the operation of tipples, dry cleaning, de-dusting and other coal preparation facilities.

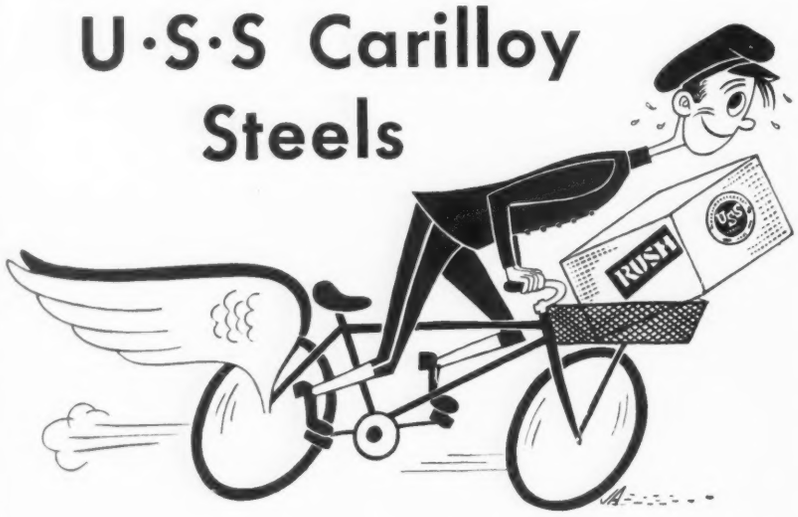
With this background of successful experience in the coal industry, Pangborn engineers offer you an effective and economical solution to your dust problems.

Write for free Bulletin 909A, "The Control of Industrial Dust". Address Pangborn, *world's largest manufacturer of dust control and blast cleaning equipment,* at 288 Pangborn Boulevard, Hagerstown, Maryland.

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Now... prompt deliveries on U·S·S Carilloy Steels



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YOUR alloy steel requirements are best served by our stocks of constructional AISI alloy steels readily available from our warehouses. U·S·S Carilloy Steels are manufactured to a *Guaranteed Minimum Hardenability*. Charts are furnished with each shipment to you as your guide and assurance of this *Guaranteed Minimum Hardenability*.

Moreover, when you place an order for U·S·S Carilloy Steel, our metallurgical service goes a step further: *We send you data with each individual shipment showing complete and specific information about the steel you receive.* This specific data on its composition, potential physical properties and fabrication will guide you in obtaining maximum performance from the steel furnished on your order.

Take advantage of all this information in supplying your alloy steel requirements. Use U·S·S Carilloy Steels from our large stocks.

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BOSTON	176 Lincoln St., (Allston 34), P. O. Box 42	STAdium 9400
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UNITED STATES STEEL

removal of men from unsafe working places has been reaffirmed and made clear to all inspectors. "Inspection methods and utilization of these procedures is uniform throughout the country and a coal mine, regardless of its geographical location, will be inspected and compliance ordered under the same criterion and standard as all other mines in the country," he concluded.

•

Senate Hears Witnesses On Anti-Pollution Bill

Three witnesses from the National Coal Association appeared before the Senate Subcommittee on Flood Control and River Improvement on May 7 to present the coal industry's opposition to S. 418, a proposal that would empower the Surgeon-General to establish pollution standards, apply for court action if states did not secure abatement of the pollution complained against and provide for loans and grants-in-aid for treatment plants. A. B. Crichton, president, the Johnstown Coal & Coke Co., contended that there is no known satisfactory solution of the problem of acid mine drainage, that costs would be tremendous and that pollution is a local and state problem.

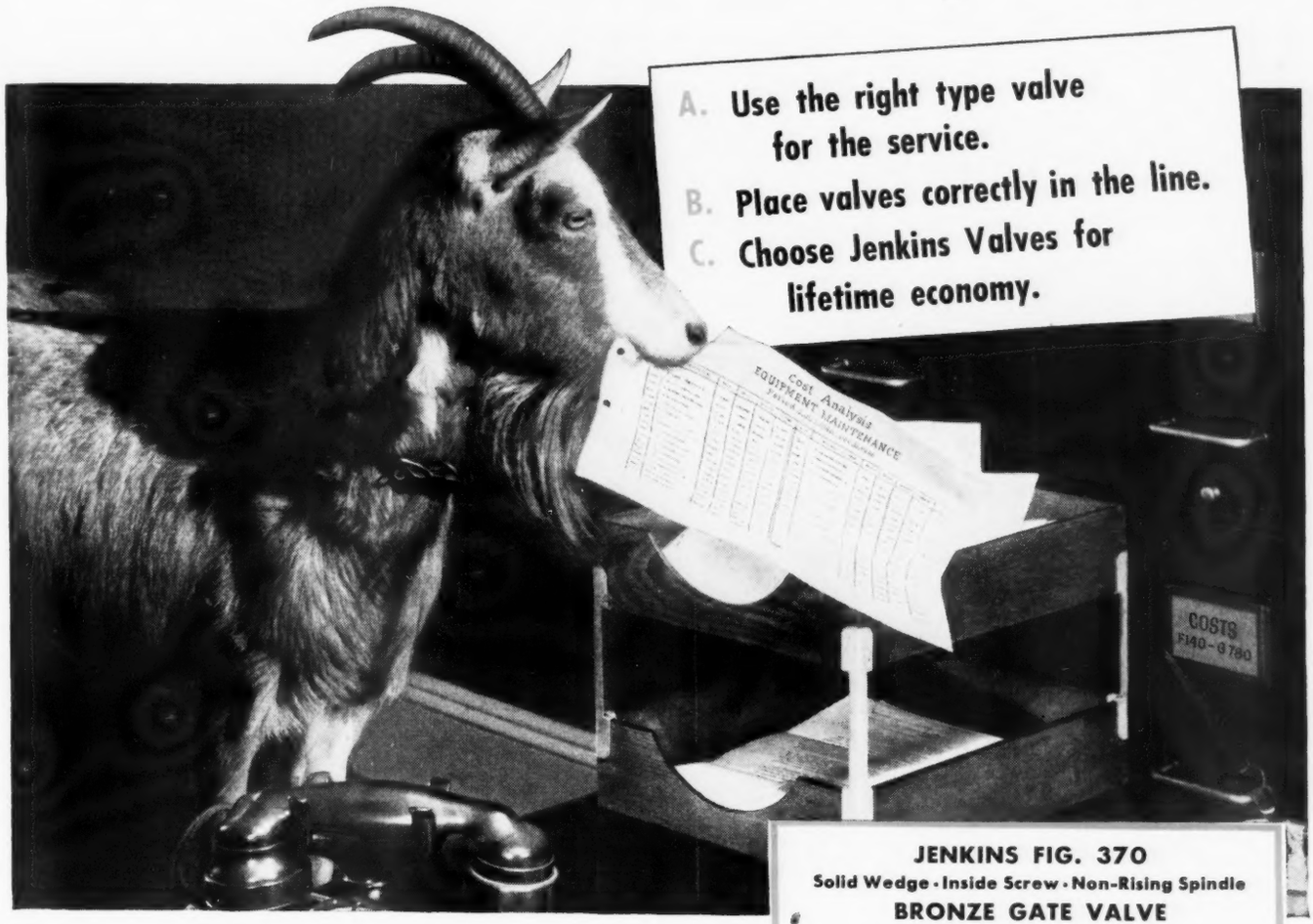
Dr. Harold J. Rose, vice president, Bituminous Coal Research, Inc., pointed out that the proposed bill is faulty in the absence of standards, the powers it would vest in the Surgeon-General and the lack of specifications as to what degree of purification would be required. He stated also that the greatest need now is for more facts obtained by research, rather than legislation. Harry Gandy Jr., a member of the staff of N.C.A., stated objections to the further giving of blank checks to Government bureaus, the vagueness of the statute, the encroachment on states' rights and the vast capital expenditures that would be necessitated by passage of the bill. Dr. A. C. Fieldner, chief, Fuel and Explosives Division, U.S. Bureau of Mines, on May 9 corroborated the testimony of the preceding witnesses. In a supplemental statement filed on May 9, the N.C.A. requested specific exemption for the coal industry if it should be the subcommittee's desire to report some type of anti-pollution measure.

•

Fireboss Retires, 55 Years Without Injury

Isaac D. Williams, fireboss, Rockvale No. 3 mine, Colorado Fuel & Iron Corp., recently retired with the enviable record of 55-years service to the company without a lost-time accident. In recognition of his service, Mr. Williams was presented with a diamond-studded 50-year pin by Robert L. Hair, general superintendent of mines. In a personal letter accompaning the pin, C. W. Meyers, president of the corporation,

Today's Maintenance Costs Ain't Hay . . . follow this Formula and keep 'em down

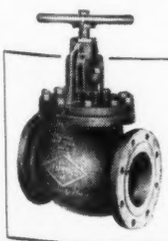


WITH THIS SIMPLE ABC formula, you can avoid needless valve maintenance costs . . . thereby aid management in its drive for economy. Records of thousands of valve users prove that it works.

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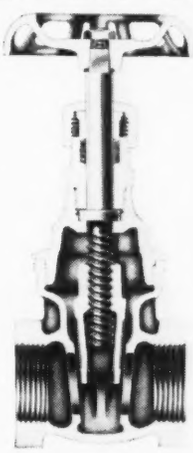
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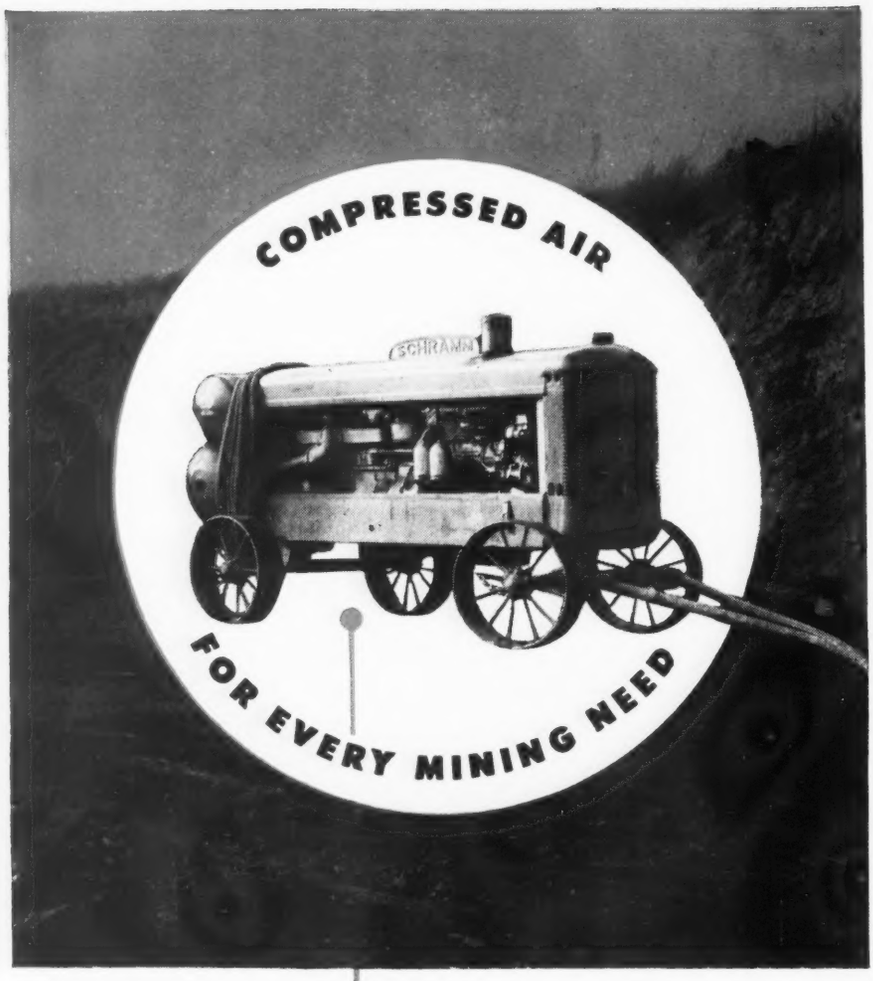


125 lbs. Steam

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This valve gives dependable service where full, free, unobstructed flow is required. For steam service especially, the solid wedge affords maximum resistance to pressure strains. Wedge design provides full thread engagement when valve is closed. When valve is fully opened, wedge entirely clears pathway. Extra stamina for extra service —spindle metal has tensile strength of 55,000 lbs. p.s.i.

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Users of Schramm Air Compressors list these features as outstanding: (1) 100% watercooled (2) mechanical intake valve operating from cam in perfect timing (3) forced feed lubrication (4) larger discharge valve with lower lift adding to efficiency.

Too, there's a push-button to allow instant starting. Every Compressor is compact, lightweight, easy to move about on the job.

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complimented Mr. Williams on his record and pointed out that only 20 other 50-year buttons had been awarded in the company's 75 years.

Stoker Fuel to Be Made From Wood Plant Refuse

Production of walnut-sized stoker fuel from refuse from the planer, box factory and sash and frame departments of the Western Pine Mfg. Co. has been launched by the Pres-To-Log Co., Spokane, Wash. Daily capacity will be 35 tons of log and stoker fuel. The stoker fuel, it is claimed, can be burned in any stoker.

Mileage Records Set By R.R. Coal Locomotives

New world records for coal-fired steam locomotives were reported April 29 to operating and engineering officials of many larger railroads of the United States and Canada who met at Battelle Memorial Institute, Columbus, Ohio, as guests of the motive power committee of Bituminous Coal Research, Inc., Pittsburgh.

"Six modern coal-fired Niagara class engines of the New York Central R. R. made greater monthly mileage from Oct. 1, 1946 through March 31, 1947, than was ever thought possible for a steam locomotive," E. C. Payne, Pittsburgh, chairman of BCR's steam locomotive performance subcommittee, told the motive power men. "Individual engines made world records exceeding 28,000 miles per month during the six-month period in which all six operated 786,818 miles for an average of almost 22,000 miles per month." Association of American Railroads' statistics show a monthly average of only 6,743 miles for active passenger locomotives on Class 1 railroads in 1946.

"These locomotives were assigned to modern passenger trains," Mr. Payne reported, "and burned mechanically cleaned egg-sized coals from Western Pennsylvania, Ohio and Southern Illinois. They were refueled twice enroute between the Harmon, N. Y., and Chicago terminals, a distance of 926 miles.

"The periodic servicing required by law and other necessary maintenance were expedited," Mr. Payne concluded, "to permit greater availability of these locomotives. The high monthly mileage attained, however, is offered as proof of the superior performance and availability of modern coal-fired steam locomotives when they are supplied with good coal and given the prompt service attention which they deserve."

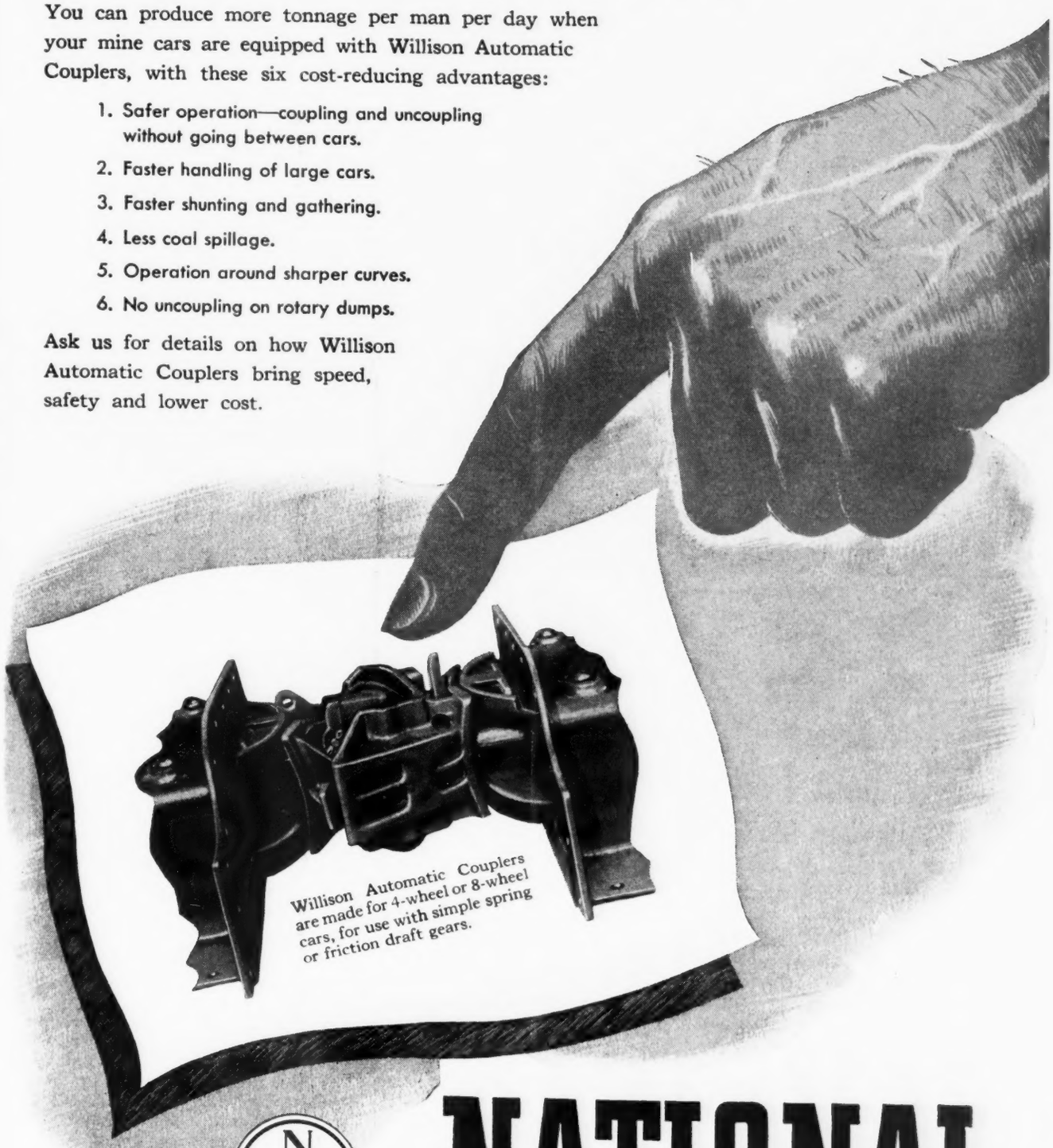
The meeting was held to analyze current progress of the locomotive research projects being directed by BCR and to determine the scope of future activity. BCR has research under way to improve the performance and availability of the thousands of coal-fired steam locomotives in use.

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Smokeless Fuel Plants Will Start Up in Utah

The $100,000 plant of the Records Coal Processing Co., Wellington, Utah, will go into operation July 1, according to recent announcements. Production will start at 100 tons daily and will increase later to 500 tons. The carbonizing process will be used to extract gases, oils and smokeless fuel.

Almost simultaneously, prediction of operation by mid-June of a 100-tons-per-day smokeless fuel plant in Salt Lake City was made by Coal Logs Co., Inc. Preliminary tests made at the new plant indicate production of smokeless fuel from Utah coal at or near the price now being paid for raw coal, without loss of heat or burning qualities. The company also will produce char for use in standard coke ovens along with metallurgical coke from non-coking Utah coal. Byproducts will include volatile oils to be used for production of chemicals.

•

Legislature Postpones Ohio Strip-Mine Bill

The Ohio Senate conservation committee voted on May 5 to postpone indefinitely any action on the Jackson bill to regulate strip mining. The vote came after two months' consideration of recommendations of the nine-member Ohio strip-mining study commission, which was created at the preceding session of the legislature to draw up a measure.

•

Anthracite Laboratory Rejected by House

Elimination of an appropriation committee recommendation for establishing a government anthracite laboratory at Schuylkill Haven, Pa., was voted by the House of Representatives in Washington, April 26 by a vote of 134 to 118.

The move came with the adoption of a surprise amendment to the Interior Department appropriation bill by Representative Keating (R-NY), which knocked out all appropriations for the laboratory. The amendment was offered, it was said, to resolve a dispute between two representatives from Pennsylvania over whether the laboratory should be located at Hazleton or Schuylkill Haven.

•

Mine Abandoned After Shaft Cave-In

Closing of the Burr Oak Coal Co.'s Tamaroa (Ill.) mine, where heavy rains caused a shaft cave-in followed by a tipple collapse on April 26, was announced three days later and dismantling was expected to begin immediately. Although the mine still

YOUR CHANCES OF GETTING AHEAD

FOR 20 years we have been whittling away the foundations of our economic structure. We have been cutting away the incentives to "get ahead in the world," to increase production and to improve efficiency. Unless this process is reversed soon, we risk the sort of industrial stagnation that currently afflicts Great Britain so disastrously.

How far the whittling has gone is shown by the statement in the center of the page. It shows that everyone's stake in working harder and getting ahead has been reduced sharply since 1929. In that year, anyone who was even moderately successful could look forward to reaping the rewards of his success. If he earned $5,300 annually over a period of 25 years he could retire on a comfortable income of $3,000 per year. Or he could pile up enough capital to go into business for himself. He could fulfill the American dream as phrased by Abraham Lincoln in his first annual message to Congress in 1861:

"The prudent, penniless beginner in the world, labors for wages awhile, saves a surplus with which to buy tools or land for himself, then labors on his own account another while, and at length hires another new beginner to help him. This is the just and generous and prosperous system, which opens the way to all, gives hope to all, and consequent energy and progress, and improvement of condition to all."

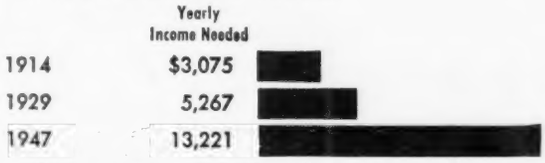
Look at the situation today. To retire on an annual income from investment that will buy as much as $3,000 did in 1929, a young man needs to earn over $13,000 a year for 25 years. That's more than 2½ times the income he would have needed in 1929. The same thing is true of acquiring a stake in a business.

YOUR CHANCES OF GETTING AHEAD

To see how your chances of getting on in the world have changed during the past few decades, the McGraw-Hill Department of Economics has calculated how much it now takes to save enough to acquire a retirement income or a comparable stake in a business, as compared to what it took in 1914 and 1929.

The objective set is an income from investment equal to $3,000 a year in 1929 dollars. It is assumed that the savings required to yield this income are made over a period of twenty-five years. During that period it is also assumed that $4,000 per year (in 1929 dollars) is spent on living expenses.*

Here is how the figures work out:



It now takes more than four times as large an annual income as it did in 1914 to gain a comparable stake. It takes well over twice as much as it did in 1929.

Changes in three factors — federal income taxes, living costs, and interest rates — explain why the income needed has multiplied so. Here's how these factors line up for the three years.

	Federal Income Taxes Married Man, 2 dependents		Cost of Living (Index Numbers 1935-39)	Interest Rate High-grade Corporate Bonds
	$5,000 income	$10,000 income		
1914	$10	$60	71.8	5%
1929	$3	$40	122.5	5%
1947	$589	$1,862	155.0	2½%

Similar calculations show that if we could reduce federal expenditures from $35 billion to $25 billion annually, raise interest rates by one-tenth and lower living costs by 15% — all realistic possibilities if we make the effort — then the income needed to build up such a retirement fund would come down to $9,500. The chances of realizing that goal would then be restored to what they were in 1929.

*Several other factors were omitted from the calculations because they would not have a decisive effect on the results. Thus, existence of social security pensions and retirement funds now reduces the income needed; but if state income taxes were added, the income needed would increase.

Why Try to Succeed?

While the income needed for retirement today has increased 2½ times — or by more than 150% — since 1929, the average person's income has increased only 80%. So the average man's chances of achieving success are really slimmer now than a generation ago.

This 1929-47 trend is something new in America. The average person's chances of getting ahead improved during 1914-29. In that period the dollar income needed for retirement or a stake in business rose by 75%, but the average income rose by 100%. So more people were within striking distance of success and security in 1929 than in 1914. The story has been different since 1929.

Fewer people actually do achieve financial success today. Only 1% of all families now have incomes large enough to build up a retirement fund or a stake in business. In 1929 almost 6% of all families attained a comparable degree of success.

Higher taxes are the most important reason why it takes so much more now to build up a competence. They account for one-half the increase in the amount needed. The other half is explained by higher living costs and lower interest rates.

It is, of course, true that few people ever get into the higher income brackets. So the process of cutting

away the incentives which play such a key role in our economic system affects comparatively few people immediately. It does, however, have a powerful indirect effect on all of us.

Everybody Loses

When half to four-fifths of any additional income of successful people goes to Uncle Sam a heavy drag is obviously put on doing the work to get it. Thus, we stand to lose the benefit of full use of the nation's best brains. By so doing we stifle industrial progress. And the loss in productive efficiency far outweighs the tax revenue the Treasury gains. Carried far enough, the process of stifling economic progress by slashing rewards leads straight to industrial stagnation.

The same process also multiplies the risks of embarking on new capital investment. High taxes rule out all but the most profitable new projects and restrict most expansions to boom times when profits are high. So capital investment follows a boom and bust pattern and, by so doing, contributes much to ups and downs in production and employment.

The Sorry Plight of Britain

The case of Britain today provides an object lesson of how blighted incentives produce industrial stagnation. *Britain's number one economic problem is to get more production. But the tax load there is so heavy it stifles the incentive to produce more.*

A coal miner who works an extra shift pays about a third of his added earnings to the tax collector. And, as the London *Economist* comments, tax rates on business executives are so high that they kill every incentive except that to tax evasion. In short, not only is the incentive to succeed blighted, but so is the incentive to work.

A root-cause of Britain's trouble is this: The cost of an expensive program of social benefits has been piled on top of the heavy costs of paying for past wars and trying to prevent future wars. Tax rates are boosted accordingly. What her experience proves is that the attempt to provide excessive social benefits may defeat itself. It raises the tax burden on rich and poor alike and smothers the incentive to work. So the underlying basis of all economic benefits—production—is eaten away.

We in the U. S. haven't traveled as far down the stagnation road as Britain has. Taxes amount to about 26% of national income here as against about 45% there. But, unless we start soon to build up incentives to do better work, instead of whittling them away as we have been doing, we will catch up with Britain fast.

It's Late but Not Too Late

Can anything be done? Decidedly yes, *particularly by tax reform and reduction in the cost of living.* As far as interest rates are concerned, any large increase would raise excessively the cost of carrying our war-swollen national debt, and hence raise taxes. But some increase in what are now excessively low interest rates may well be both feasible and desirable.

Action on the tax front is the first order of business. Our jerry-built tax structure is the thing that is chiefly responsible for cutting the incentives to work harder. Two things are important: 1) Government spending must be pared to the bone; 2) The tax system must be completely overhauled to remove the shackles on all-out production.

The 56th editorial in this series, published in March, outlined major steps that need to be taken in remodeling federal taxes in order to increase incentives to individual and business enterprise. *The revenue bill now before Congress is no more than a short step in the right direction. Much more must be done to clear the way for high production and rising living standards.*

Lifting the blight which taxes now place on incentives would help cut the high cost of living. It would stimulate greater production and greater efficiency. But a further step is necessary. Part of the benefits of improved efficiency must be passed on to consumers in the form of lower prices.

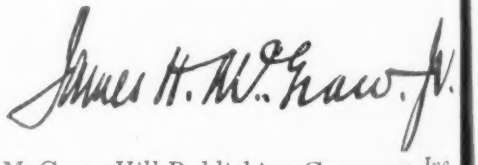
In the past few years we have been following precisely the opposite course. In many cases wages have been increased all out of proportion to increased productivity. Result—soaring prices and a severe squeeze of the consumer, to which some greedy exploitation of war-created shortages has also contributed.

To Give Ability a Chance

Our basic and most crucial problem is to get back on the track which leads to higher production and improved living standards all along the line. We got off that track in the 30's. Then, we started scrambling for larger slices of the same pie instead of trying to produce a larger pie. Now the process of getting back on the track is greatly complicated by the tremendous tax burden growing out of the war.

Yet it's not too late to turn back from the road that leads to industrial stagnation. As the statement in the center of the page shows, we could restore the odds of getting ahead to what they were in 1929. Cutting the federal budget to $25 billion a year and putting the tax structure in good order are the crucial first steps.

By taking these steps soon, Congress can go far to restore the incentives to hard work and efficiency which have been so largely washed away in the past 20 years. If they are not taken the American dream of getting ahead by hard and effective work will exist only in the history books, and our children will inherit from us an economic order without opportunity, without hope, without individual liberty.

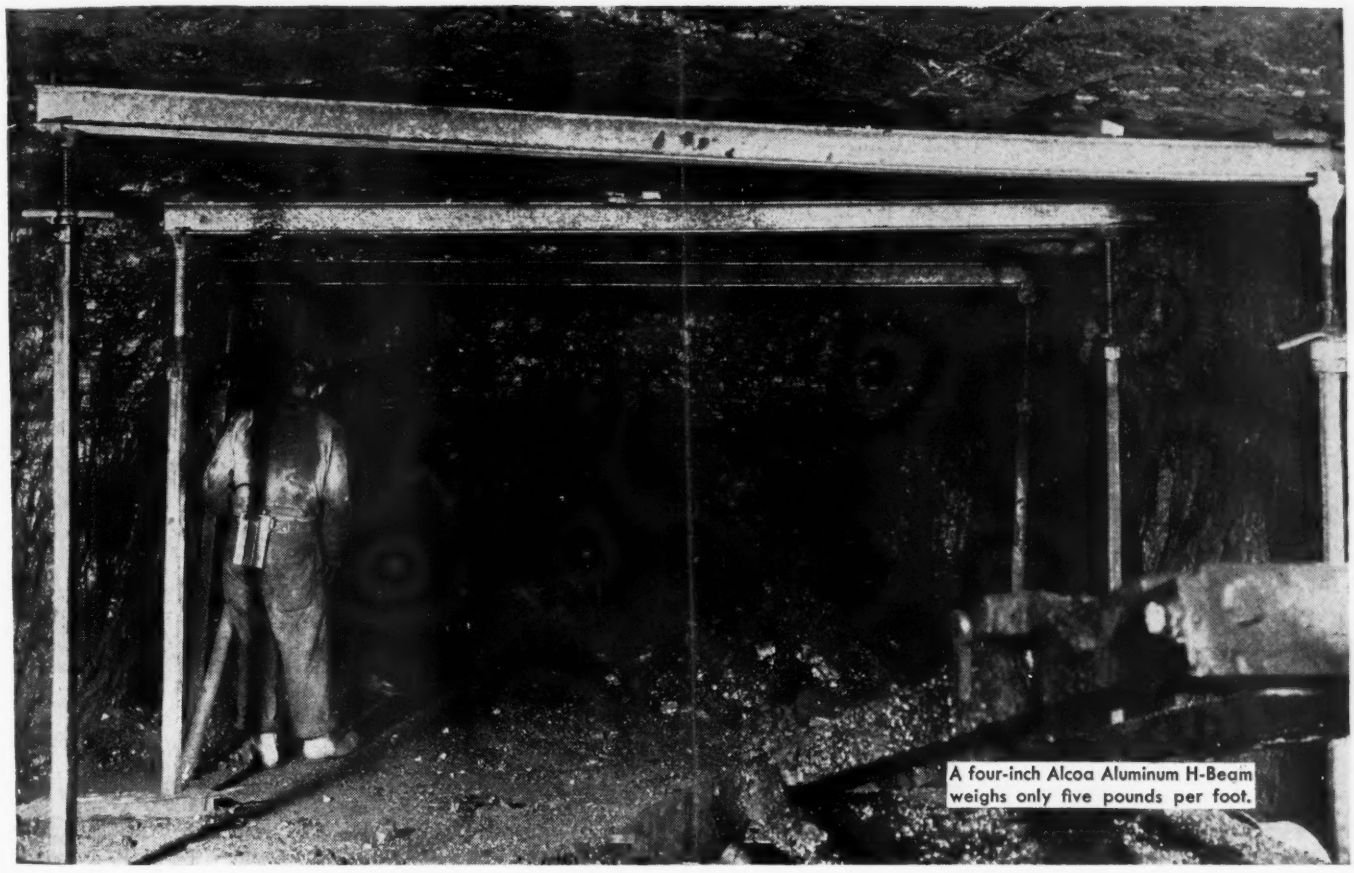


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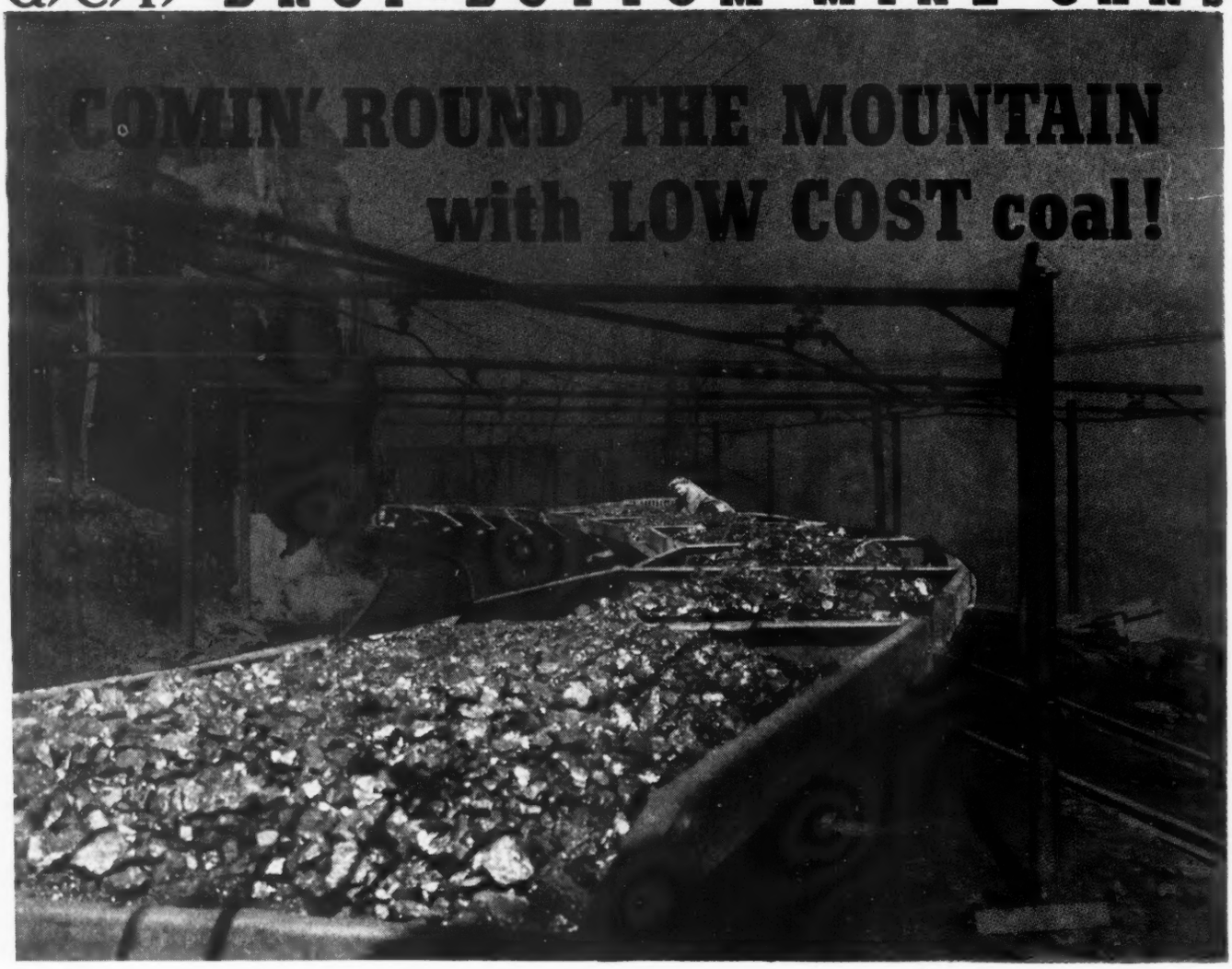
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has "years of productive life as far as the coal supply is concerned," local officials expressed doubt that the 240-ft. shaft could be reopened and pointed out that sinking a new shaft would be too expensive.

•

Bill to Tax Missouri Strip Tonnage Killed

A measure to levy a tax of 5c a ton on strip-mined coal to pay the costs of leveling spoil banks and filling ditches was killed in the Missouri House of Representatives committee on May 1 by a vote of 9 to 1. Frank M. Eviston, vice president, McAlester Fuel Co., told the committee that passage of the bill would throw "an unknown number of men and women" out of employment and seriously affect "many small communities depending on coal mining activities."

•

Draft Device Promises Rail Fuel Savings

A new "undergrate air distributor," invented by Vaughn Mansfield, chief engineer, Southern Coal Co., Inc., and secretly tested on U.S. and Canadian railroads for the past three years, promises to improve railroad fuel efficiency by 10 to 15 percent, according to an announcement issued May 1 by the Southern Coal Co., Inc., and Bituminous Coal Research, Inc. The device is simple and inexpensive, the announcement said, and can be attached to the firebox of any coal-burning locomotive for a few hundred dollars in a few hours' time. It consists of a long, narrow steel box attached parallel to the side of the firebox where the air enters the ashpan. Open at the top, the box contains crosswise steel baffle plates which distribute the air evenly throughout the firebox. One box is installed on each side of the locomotive. There are no moving parts.

"The device should save $4,000 to $5,000 a year on each locomotive to which it is applied," Mr. Mansfield said.

•

Four Mines Close Down In Scattered Areas

Announcements of the closing of four mines in Ohio, Illinois, Colorado and Texas were made in April. At least three of the actions were precipated by the recent safety shutdown.

The Globe Iron Co., Jackson, Ohio, closed its Globe mine April 7. The mine, under development for a year and a half, had been declared unsafe by Secretary of the Interior Krug and the decision to keep it shut down was reached as a result of the small production during the development

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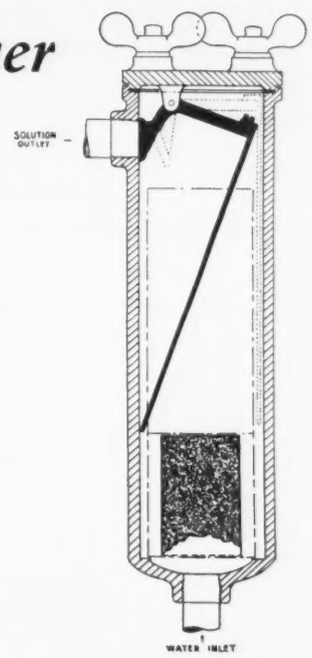
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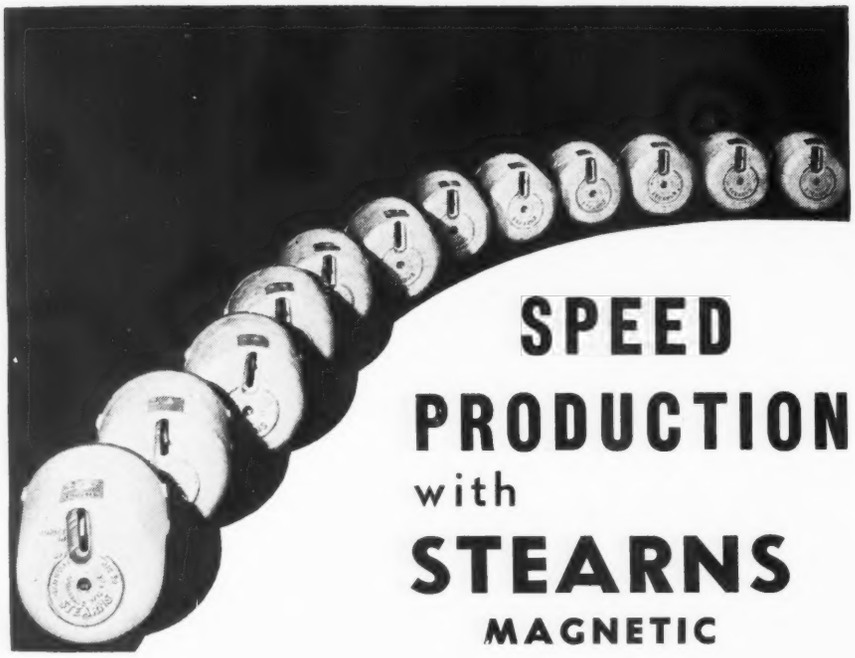


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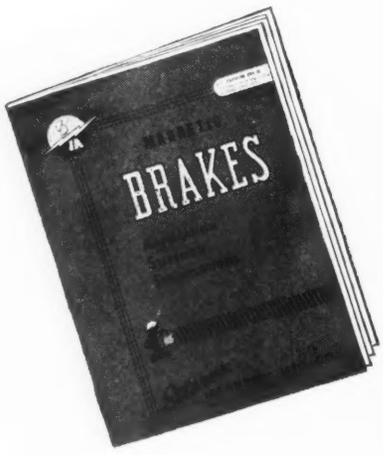


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BRAKES
MAGNETS

operation. About 30 men were on the payroll when the closing order was issued.

In Colorado, the American Smelting & Refining Co. discontinued operations at Bon Carbo and Cokedale on April 10. The Cokedale mine had been listed among 518 unsafe mines by Secretary Krug, but was certified as safe shortly afterward.

The Bunsenville mine of the U.S. Coal & Coke Co., near Danville, Ill., was closed about April 25, after the safety shutdown. The mine was ready to reopen when the announcement came, but officials pointed out that it had been operating at a loss for 20 years. Harry Moses, president, stated that the mine had been marked for closing as of June 30, 1947, but that present conditions in mining activities made immediate closing imperative. About 700 men were employed by the company.

In Texas, the Gallup Southwestern Coal Co. ceased operations on April 12 because of declining markets for its coal. The company had provided coal for the Santa Fe R.R. At the time of its closing, 40 men were employed.

•

Senate Hears Testimony On Natural Gas Bill

With House hearings temporarily recessed, the Senate Interstate Commerce Committee opened hearings early in May on proposals to amend the Natural Gas Act. Principal measure before the committee is the Moore bill, which would prohibit the FPC from controlling the production, gathering and consumer use of natural gas. It is identical with the Rizley bill under consideration by a House committee. Nelson L. Smith, chairman, FPC, asked the Senate committee to withhold action on the bill pending an FPC report on July 1, which will announce changes in the administration of the act to meet criticisms from industry and Congress. Chairman Smith pointed out also that natural-gas companies have asked for facilities that will almost double daily capacity to some 8,459 million cubic feet. New facilities, if granted, would displace about 130,652,000 tons of bituminous annually.

Tom J. McGrath, representing coal producers and the Chesapeake & Ohio R.R., appeared before the committee to oppose the bill.

Meanwhile, natural-gas interests sought permission from FPC to extend their operations in widely scattered parts of the nation. The United Gas Corp. asked for authority to build a $57,000,000 system extending easterly from Hattiesburg, Miss., through Alabama, Georgia, northern Florida and into southeastern South Carolina. The Southern Natural Gas Co. applied for permission to bring natural gas to much of this same territory through a 225-mile 16-in. pipeline at a cost of some $25,000,000.

The United Natural Gas Co., which

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Hunter Construction Co. of Ada, Oklahoma, is another of the hundreds of smart earthmovers who are finding that modern LaPlant-Choate scrapers move more dirt at less cost—even with old tractors. Note the heaping load being handled by this LaPlant-Choate C-114 on a highway relocation job near Ardmore, Oklahoma.

Why gamble with inefficient pre-war scrapers when you can get modern **LPC's** in a hurry!

The old story about "trying to do *tomorrow's* jobs with *yesterday's* equipment" is *doubly* true of scrapers—because it's the scraper that handles the payload, which in turn controls your profit on every job. Consequently, in times like these, it just doesn't pay to struggle along with inefficient, old style scrapers that waste valuable pay yardage, burn up tractor power and require excessive maintenance. Far better to replace those old "relics" *now* with modern LaPlant-Choate units—proved by competitive tests to be the *easiest loading, fastest spreading scrapers on the market.* This way you'll get higher average production at lower over-all cost and thanks to LPC's modern open top design, which simplifies loading with shovel or dragline, you'll also be able to use your scrapers for utility hauling and spreading. Best of all, LaPlant-Choate scrapers in most sizes (from 2 to 14 yd. struck measure) are ready for *immediate delivery.* So don't delay. Better get complete facts today from your nearest LPC distributor. LaPlant-Choate Manufacturing Co. Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, California.

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Heat holds no terrors for the "fire-eater" — or for Collyer Asbestos Wires. The heavy overloads and hot locations that break down ordinary insulations do not affect Collyer asbestos. Where moisture, corrosive vapors, and heat up to 230° F. are expected, Collyer Asbestos Varnished Cambric (A.V.C.) insulation is recommended. Made by improved methods, with new non-toxic resin impregnating compounds, this wire is ideal for control and power circuits in steel mills, foundries, mines, and boiler rooms, for voltages up to 7500. Collyer All-Asbestos Wire withstands extreme temperature, up to 400° F. under dry conditions, on rheostats, control panels, heating equipment, etc., and gives maximum protection against overloads or high ambient temperatures.

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distributes gas to various cities in a small area of Ohio and in northwestern Pennsylvania, has petitioned FPC for permission to build 71 miles of 20-in. pipeline to connect its facilities with the Big and Little Inch lines. The company stated that unless it can obtain gas from these lines, it cannot meet its present requirements and normal growth requirements of domestic, commercial and industrial consumers.

The Central Kentucky Natural Gas Co. has asked FPC for authorization of new facilities for delivering additional natural gas to the Cincinnati Gas & Electric Co. and the Union Light, Heat & Power Co. Costs of the new construction are estimated at $1,933,000.

Fears of shortages of natural gas for the heating season next winter continued, however. After a nationwide survey, the FPC predicted that the shortage will be as acute next winter as it was last year and will extend from the Rockies as far east as New York State. A major factor in the bottleneck, FPC declared, is the shortage of steel pipe, which shows little sign of abating within the next several months.

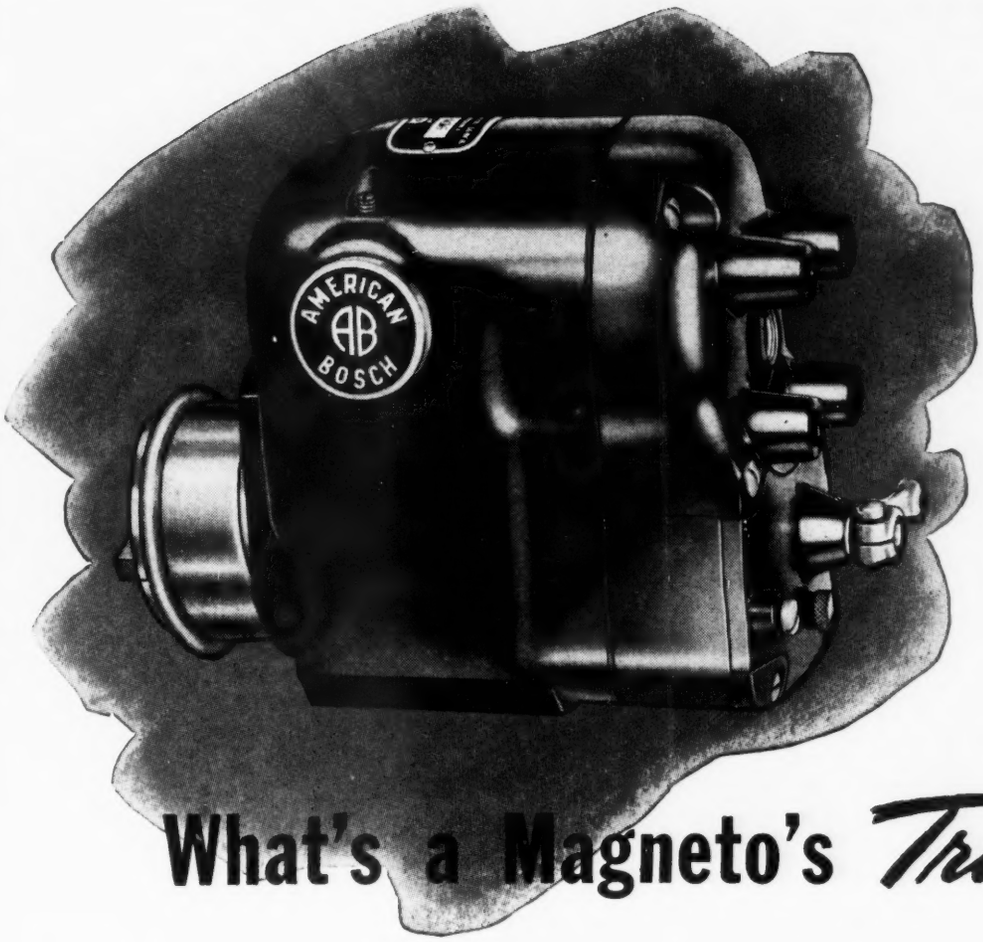
The Gas Service Co. has filed requests with public service commissions in Missouri, Kansas and Oklahoma asking that it be permitted to refuse service to new commercial customers in order to protect present customers. Along the same lines, FPC approved emergency allocation plans submitted by the Mississippi River Fuel Corp. to govern distribution to its customers in Illinois, Missouri and Arkansas in the 1947-48 heating season.

Temporary authorization was granted by FPC to the United Fuel Gas Co. for construction and operation of about 70 miles of 20-in. pipeline and auxiliary facilties in West Virginia at a cost of about $2,970,000. The temporary authorization was granted to permit completion of the line by June 1 in order that gas may be delivered for storage this summer to meet peak needs next winter.

Widespread Smoke Studies Continue

A program of smoke elimination for homes and small industries was announced by the Smoke Abatement Advisory Committee of Fort Wayne, Ind., on May 8. Machinery for making the program successful included the following: study by the city smoke inspector of the St. Louis plan; an appeal to civic pride and economic considerations; an educational program through newspaper publicity and pamphlets; and a survey of public and parochial school system heating plants.

In Terre Haute, Ind., a special committee of the Chamber of Commerce, in cooperation with the Coal Trade Association of Indiana, recently conducted a survey of 100 factories and other large users of steam power. A



What's a Magneto's *True Cost?*

It isn't on the price tag, of course. Cost per year of service is the only true cost . . . the sum of first cost and all maintenance and "down-time" costs divided by the number of years the magneto lasts.

The true cost of American Bosch Magnetos is a *low* cost. They are known for dependability . . . for their ability to stand up for years under the heaviest demands — with only a minimum of care and adjustment.

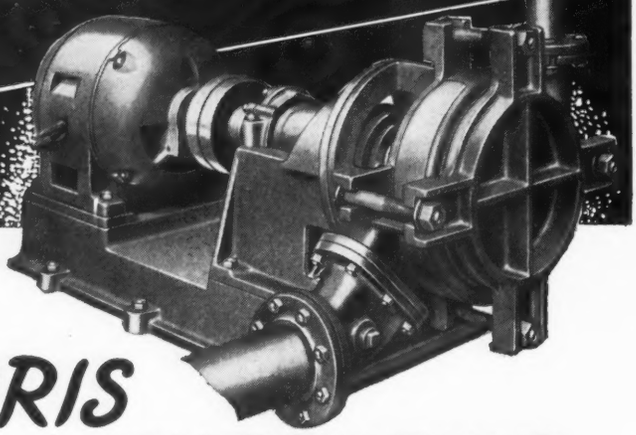
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Only the Morris Type "R" Slurry Pump Has These Four Exclusive Features!

1. *The gland is under suction pressure only.* This feature practically eliminates packing troubles.

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● The New Morris Type "R" Slurry Pump handles all types of mixtures containing abrasive solids . . . ore concentrates . . . tailings, slag and residue from filters and classifiers.

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check will be made at 30-day intervals to learn whether recommendations for smoke abatement have been carried out. Principal causes of smoke as found by the survey were lack of stokers, poor stoker installations, overloading of boiler furnaces, faulty draft and careless firing. An ordinance to compel compliance with air purification standards is now in the drafting stage.

Meanwhile, the American Municipal Association reported on April 29 in Chicago that 12 major cities are aiming at smoke elimination: Detroit, Milwaukee, Omaha, Los Angeles, Pittsburgh, Richmond, Va., Providence, R. I., Cincinnati and New York.

An ordinance adopted in Cincinnati and put into effect April 4 requires low-volatile coal for use in the city and requires licensing of dealers and peddlers. A Citizens Solid Fuels Committee was named to expedite the movement of low-volatile coal into the city and stocks were reported adequate for normal weather.

●

Centralia Firm Charged With Wilful Neglect

Indictments charging the Centralia Coal Co. with "willful neglect" in connection with the explosion in the company's No. 5 mine, in which 111 men died March 25, were returned by the Washington County, Ill., grand jury May 15. Indictments against two individuals were suppressed pending their arrest. The two indictments against the company charged failure to provide sufficient air to miners underground and failure to rock-dust the mine adequately. The alleged violations of the Illinois mining law are misdemeanors and carry a maximum fine of $500 each.

Earlier, on April 25, the official Bureau of Mines investigating committee had reported to Secretary Krug that firing of explosives "in a dangerous and non-permissible manner" caused the explosion. The committee found also that the explosion was a coal-dust blast and that there was no evidence to indicate that methane was involved. Forty-four men working in two sections of the mine not affected by the explosion could have saved themselves if they had known how to erect barricades after explosions, the report said.

Blame for the explosion was placed on company officials by a fact-finding commission appointed by Illinois Governor Dwight Green in a report submitted April 12. The 46-page report accused officials of the Illinois Department of Mines and Minerals of indifference in their enforcement of state mining laws and recommended that state mine inspectors be placed under civil service.

Meanwhile, the State Mines Department at Harrisburg, Pa., studied recommendations of four of its inspectors that the Justice Department investigate the possibility of negligence in

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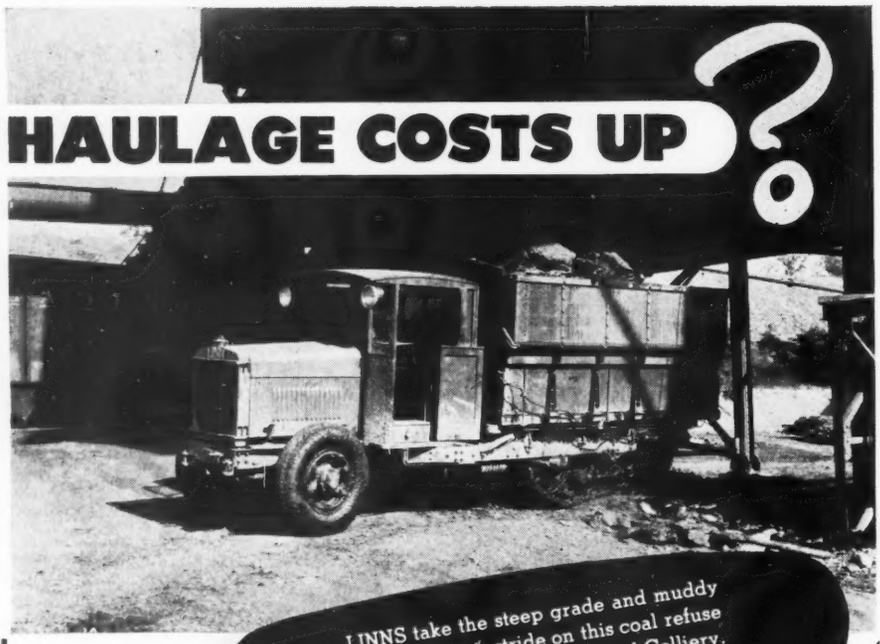
- Austin Powder Company, Cleveland, Ohio
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- British-American Industries, Ltd., New York City, New York
- The Buda Company, Harvey, Illinois
- Diamond Supply Company, Inc., Evansville, Indiana
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Coalmaster Special Alloy Steel Bits, are heat treated for high strength wear and abrasion resistance. They are scientifically shaped and machined for faster, better cutting. Especially designed for exactness in drilling all bore hole sizes for underground and strip operations.

Coalmaster Hexanspeed Assembly, above right, is a fool-proof, automatic coupling that speeds up auger changing—and increases productive time at the bore hole.

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Meet your disposal and haulage schedules in spite of weather, severe grades or tough footing. None of these can stop the LINN HAFTRAK. LINNS work and earn every day throughout the year.

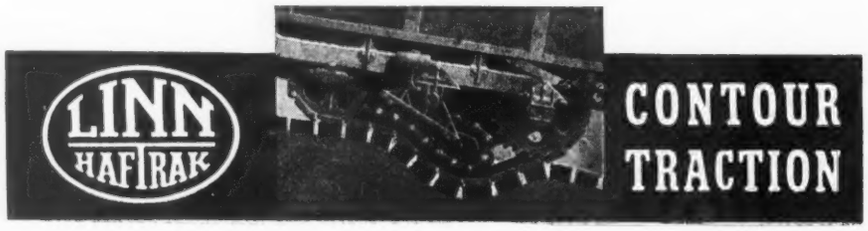
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the explosion that killed 10 men in the mine of the Panzitta Coal Co., Exeter, Pa., on April 10. The inspectors had found "inadequate ventilation" and a seepage of methane that was ignited either by an electric arc or men smoking, probably the former. In addition to the inquiry, the inspectors recommended a four-point program including the following: (1) require every mine employing 20 or more men to maintain at least five sets of "self-contained breathing apparatus" and train 12 workers in their use; (2) where changes are made in the ventilating plan of the mine, require the superintendent and mine foremen to obtain air measurements before permitting men to enter the mine; (3) require a report of such measurements within 24 hours to the district mine inspector; and (4) require periodic investigations by the operator or superintendent to determine if the mine foreman is complying with laws covering examination of all working places prior to allowing men to enter the mine.

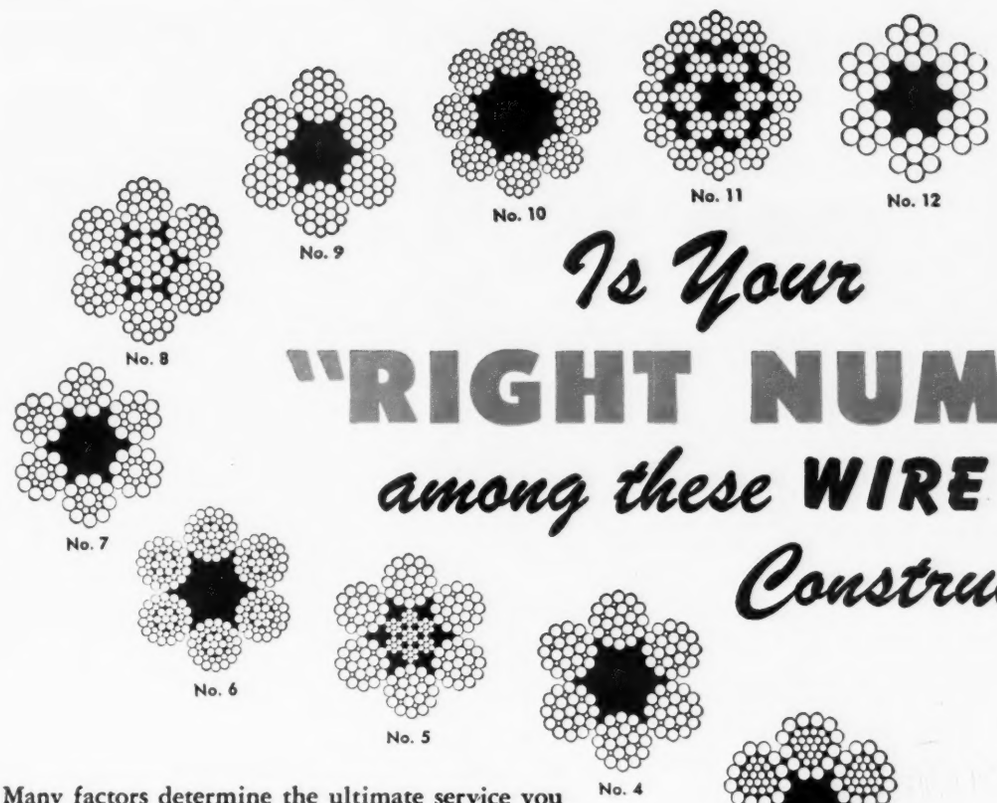
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Order Dissolves SFAW And Agencies by June 30

Executive Order 9847, dated May 6 and issued by President Truman, abolished the Solid Fuels Administration for War as of June 30, 1947, and directed that the powers of its administrator cease as of May 6, 1947. The Secretary of the Interior was authorized to wind up and liquidate the affairs of the agency.

In view of the termination of all powers and functions of the SFAW, Secretary Krug issued Orders Nos. 46 and 47 on May 14, directing the immediate dissolution of the following councils, boards and committees: the Solid Fuels Advisory War Council, the Lake Dock Advisory Committee, the Tidewater Dock Coal Advisory Committee, the SFAW National Advisory Committee on Local Distribution, the SFAW National Advisory Coke Committee, the National Anthracite Distribution Committee, the several regional Anthracite Distribution Committees, the several SFAW Area Advisory Committees on Local Distribution, the several SFAW Community Committees on Emergency Distribution and any and all other advisory or functional committees and all subcommittees appointed by any of the above-mentioned committees.

In addition, the SFAW Bituminous Coal Producers' Advisory Boards for Districts 1 through 20 and Districts 22 and 23 were dissolved and the appointment of each of their members was terminated as of June 30, 1947, with instructions that all records of the boards be transmitted to the SFAW in Washington, D. C., before June 30, 1947. By the same orders, Sections 601.11 through 601.14, Chapter VI, Title 30 of the Code of Federal Regulations were revoked.



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Many factors determine the ultimate service you may expect from a Wire Rope. Among these are size, grade, construction and quality. But equally important is selecting the correct combination of these and other vital factors. Unless a rope fits the particular job to be done, the best results will not be had.

As "HERCULES" (Red Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions—Preformed and Non-Preformed—it offers the 'right number' for *any* heavy duty job.

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No. 6–6 x 37 Round Strand–Hemp Center
No. 7–6 x 19 Seale Round Strand–Hemp Center
No. 8–6 x 19 Round Strand–Metallic Core
No. 9–6 x 19 Warrington Round Strand–Hemp Center
No. 10–8 x 19 Filler Wire Round Strand–Hemp Center
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All of these constructions are available either Preformed or Non-Preformed.

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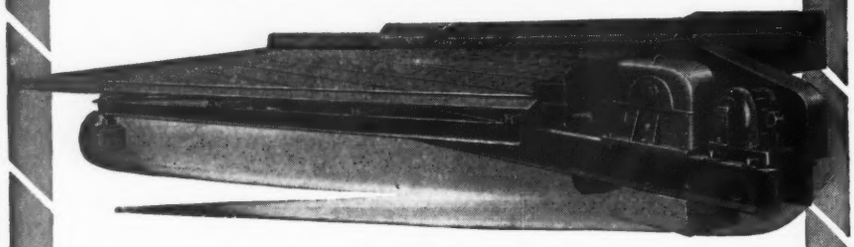
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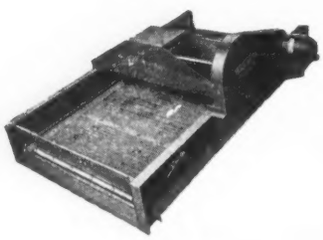


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Profitable because they offer phenomenal increases in capacity and lose less coal in refuse, while producing better washed products.

Super-Duty owes this high efficiency to its diagonal-deck design. This unique construction places 75% more effective working riffles in the natural path of the separative action. Mechanically, the action is so simple, the construction so rugged that maintenance costs are held to an absolute minimum. Power requirements are substantially 1 H. P. under continuous operation.

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McGRAW-HILL World News

LONDON—As much as 85 to 90 percent of its basic coal needs was indicated for British industry in the period from June 1 to Oct. 31, according to dispatches from London on Apr. 30. With coal the key to the entire British problem of imports and exports, this was cheering news to industrialists, whose allocation recently has been only 50 percent of needs. Two notes of caution, however, were injected into the forecast: (1) British miners went on a five-day week May 5, with uncertain effects on production, and (2) the new allocation, if made, will necessitate abandonment of the government's plans to build up a 15,000,000-ton stockpile against next winter's needs. Factors favoring the new allocation are a recent increase in mine manpower and the speed of conversions to oil.

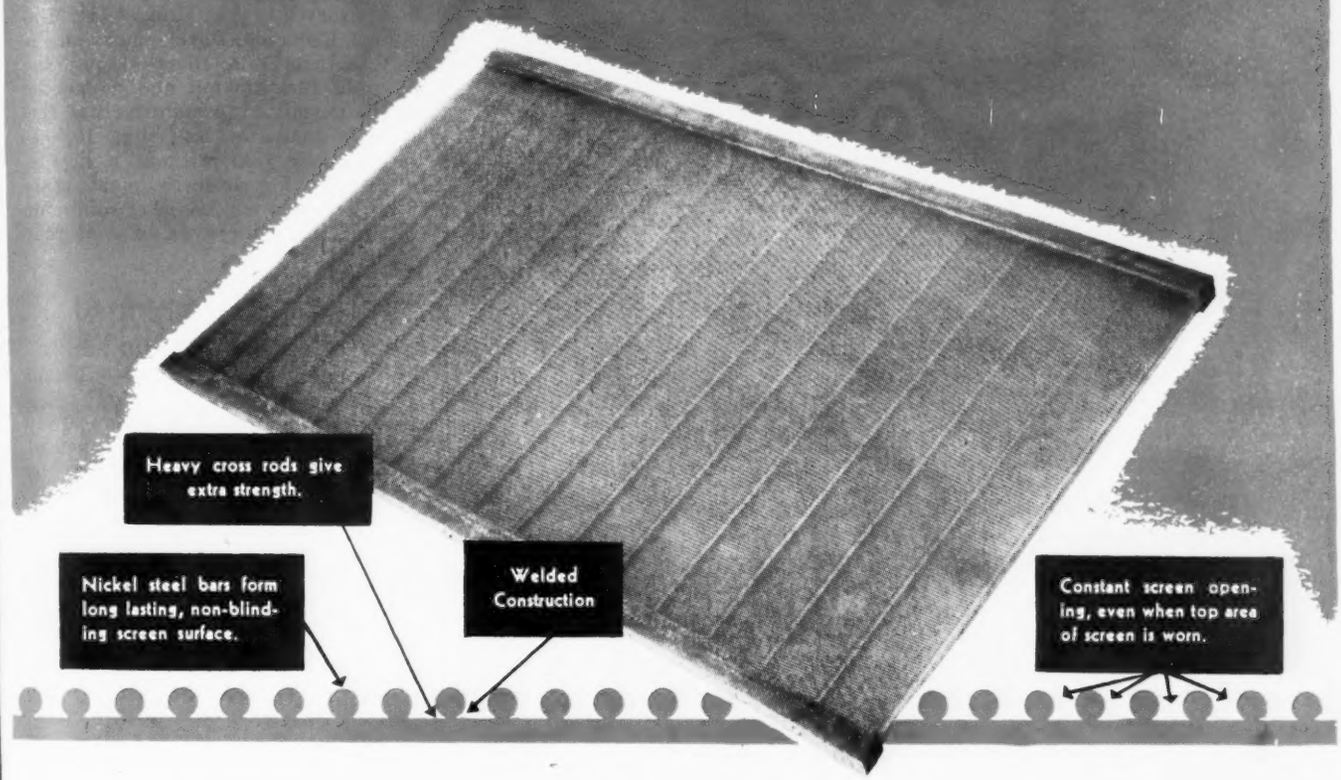
Indicating how easily the new prediction may be upset, however, 18 collieries in Durham were shut down and three more were partly affected when 150 engine winders went out on an unofficial strike May 5, the day of institution of the new five-day-week. Their action was condemned alike by government and union officials and work was resumed shortly with the help of substitute winders.

MELBOURNE—High Australian officials have abandoned their plans to move German coal-liquefaction plants to Australia and have decided instead to bring German experts, blueprints and drawings to Australia for research and development projects. With extensive brown-coal deposits in Victoria and South Australia, far removed from consumption centers, Australians are especially interested in preparing liquid hydrocarbons for economical transport. German experts are expected also to aid in underground gasification of brown and black coal and in the use of brown coal in gas works generally.

BRAZIL—Extension of coal-deposit explorations is being sought by Brazilian government officials in the hope of stepping up coal production. Known reserves total only 500,000 tons, according to the Department of Mineral Production, but prospecting thus far has not been thorough. New explorations, it is hoped, will include topographical surveys, probing of coal veins and careful analysis of coal samples. The survey will be based

Don't Fatten The Slurry Pile . . .

USE B-Z ROUND BAR SCREENS



A fat slurry pile means good saleable coal is being wasted at the washery — and it's time to investigate the money saving features of B-Z Round Bar coal preparation screens. With B-Z Round Bar screens you get:

LONGER LIFE FROM WEAR-RESISTING BARS — B-Z Round Bar screens are made of stainless steel — all-welded construction. They're harder and last longer.

CONSTANT OPENING — NO BLINDING — Round Bar construction provides a long narrow slot-type opening which minimizes blinding. Wear on top of round bars does not change screening efficiency.

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Don't lose money in the slurry pile. Investigate the proven savings of Bixby-Zimmer Round Bar coal preparation screens today.

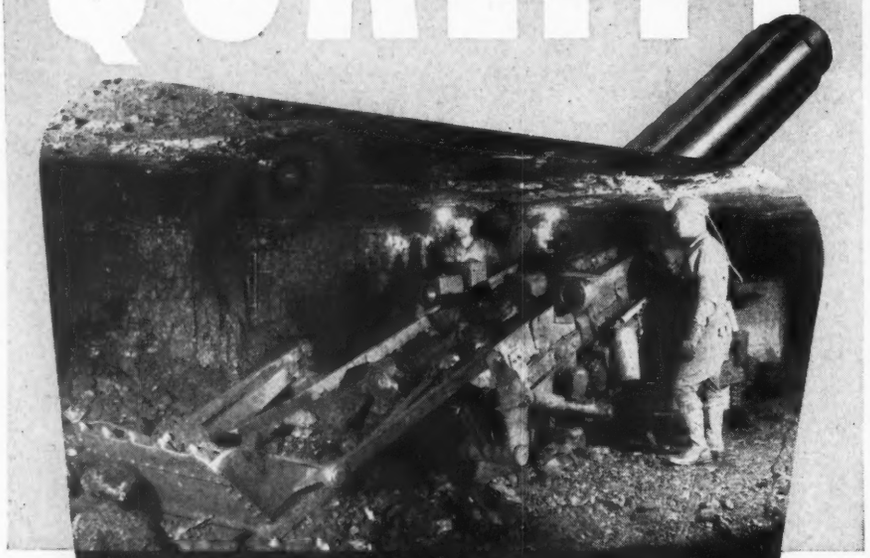
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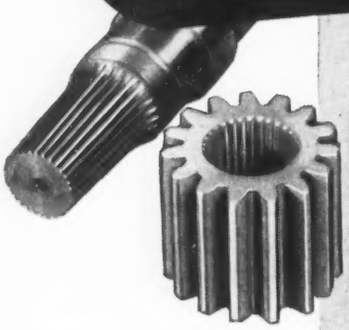
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more on quality of the coal than on volume of existing deposits.

SOUTH AFRICA—The South African government intends to control the licensing of undertakings manufacturing liquid fuel and oil from coal. The Liquid Fuel and Oil Bill, recently published for information, lays the foundation for what is expected to be a $100,000,000 industry in a few years time. Under terms of the bill, an advisory board will advise the Minister of Economic Development on the manufacture, sale, disposal and use of liquid fuel and oil and no person will be permitted to manufacture fuel or oil in quantities exceeding 10,000,000 gal. per year without a license. Applicants for licenses must state their projected maximum or minimum gallonage and the type of coal they will use.

•

Forestation Program at New High in Indiana

Completion of the 1947 installment of Indiana's largest tree-planting program was announced May 6 by L. E. Sawyer, director, Division of Forestry and Reclamation for the Indiana Coal Producers Association. The report stated that 2,500,000 trees had been set out this year on approximately 3,000 acres of land. These trees represented about one-third of the output of Indiana state nurseries. Mine owners purchased the trees from the state and bore all expenses of planting them. The 1947 program will bring the total number of trees planted by Indiana stripping operators to more than 21,000,000.

•

$62,000 To Be Paid For 1945 Mine Blast

Contracts calling for payments of $42,000 to widows of miners killed and six survivors in an explosion at the Straight Creek Coal Mine near Pineville, Ky., Dec. 26, 1945, were ordered drawn by Circuit Judge J. S. Forester on April 21. William E. Lewis, operator of the mine, announced simultaneously that 10 widows who did not sue would be given the same contract, which provides for an initial payment of $200, followed by monthly installments of $48 until a total of $2,000 has been paid. Suits originally filed totaled $169,800.

•

Coal Engineers Meet On Smoke Problems

With an increasingly large number of coal-company fuel engineers faced with design problems as the demand builds up for modern overfire air jets in smoke abatement work, Bituminous Coal Research, Inc., early last month began a series of "Jet Clinics" to provide up-to-the-minute information on installations for all types of commercial and industrial plants.

The first meeting, held May 1 at

Mass Lubrication for Mass Production

POSITIVE LUBRICATION in Seconds with Oil or Grease

SIMPLICITY and Economy of Installation

SALES OFFICES & ENGINEERING SERVICE from Coast-to-Coast

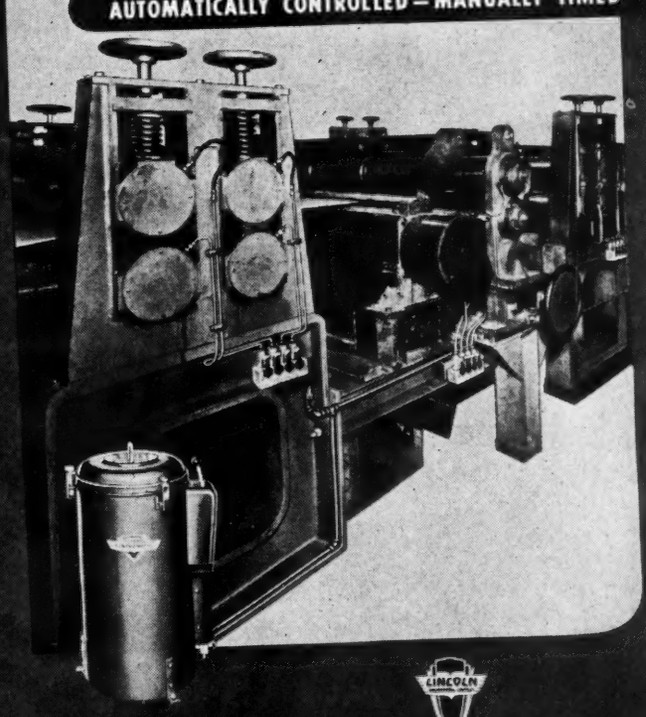
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BEARINGS • MACHINE HOURS • MAN HOURS • POWER • and PREVENT ACCIDENTS

In use throughout modern industry, Lincoln Centro-Matic Systems of centralized lubrication have proven to be the most efficient and economical method for "mass lubrication" of industrial machinery. Systems utilize only one lubricant supply line, insuring the most simplified and economical installation possible. Injectors connected by tubing to the bearings, will dispense either oil or grease, and operate by positive displacement. They are actuated by supply line pressure, and discharge lubricant to each bearing *at the line pressure*. Injectors are adjustable externally so that each bearing may receive a predetermined amount of lubricant.

Various types of lubricant pumps and injectors are available to meet specific requirements.

Cut lubrication time and cost—increase production with *proven* Lincoln Centro-Matic Systems.

LINCOLN *manufactures a Complete Line of Industrial Lubricating Equipment*

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Pioneer Builders of Engineered Lubricating Equipment

Send for Your Copy of This *New Bulletin* No. 801

It gives full information on the newest developments in Centralized Lubrication.

Lincoln Engineering Company, St. Louis 20, Mo.

Please give me information on Centro-Matic Systems for (type of machine)_____ Send me your new Centro-Matic Bulletin 801 ☐ Catalog on Industrial Lubricating Equipment ☐.

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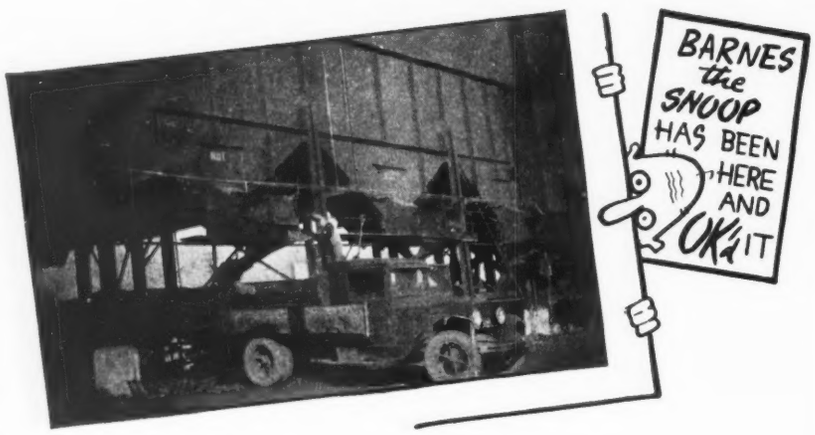
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947-8

PERFORMANCE PROVED BY HUNDREDS OF CASE HISTORIES HERE'S ANOTHER!

Holmes coal storage preparation plants eliminate a manual handling of product. Coal is lowered into storage bins at an even velocity reducing breakage to a minimum. A positive mechanical screening of the coal is provided to remove dust as it is delivered to consumer's truck. Modern design provides for ready application of coal treating methods. Designed individually to suit you location and conditions.





ROBT. HOLMES & BROS., INC.

DANVILLE, ILLINOIS

the Hotel Morrison, Chicago, was conducted by William S. Major, BCR development engineer. He was assisted by Howard Herder, fuel engineer, Sahara Coal Co., and R. L. Sutherland, combustion engineer, Truax-Traer Coal Co. More than 30 engineers attended the clinic, heard a lecture by Mr. Major on "Modern Overfire Air Jets and Smoke Abatement" and then solved three typical jet problems, using special work sheets provided for the purpose.

Those in attendance suggested that another clinic be held in Chicago within six months and it is expected that similar meetings will be requested by engineers in other coal marketing centers of the United States.

Attending the meeting were Fred H. Bird, Binkley Coal Co.; W. Callahan, Holland Coal Co.; E. C. Chase, Consolidated Coal Co.; A. J. Christiansen, Northern Illinois Coal Trade Association; John O. Daley, Peabody Coal Co.; T. A. Day, BCR; J. A. Dowdle and K. W. Karlson, Republic Coal & Coke Co.; M. T. Delabar, Norfolk & Western Ry.; Phil Edwards, Coal Engineering Co. and Chicago Coal Merchants Association; R. E. Fagerburg and S. H. Viall, Wilmington & Franklin Coal Co.; T. E. Gorman, Illinois Fuel Merchants Association; G. C. Hallquist, Evanston Fuel & Material Co.; J. H. Harrington and James R. Jones, Northern Illinois Coal Corp.; Howard Herder and M. B. Nugent, Sahara Coal Co.; Richard Hooghkirk, Iron Fireman Mfg. Co.; Joan Huster, Chicago Journal of Commerce; R. G. Johansen, Central Indiana Coal Co.; William S. Major, BCR; Robert F. Milligan, Crerar Clinch Coal Co.; John H. Palmer, William C. Pearson, Marshall Peterson and M. R. Winfield, Franklin County Coal Corp.; Sam Radner, smoke department, City of Chicago; K. C. Richmond, Coal-Heat; Carter Schupp, Delaware, Lackawanna & Western Coal Co.; L. S. Spring, Eastern Gas & Fuel Associates; R. L. Sutherland, Truax-Traer Coal Co.; and Albert E. Vatter, Walter Bledsoe & Co.

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P. & R. Tells Employees Use of Profits

The Philadelphia & Reading Coal & Iron Co. is responsible directly and indirectly for an annual payroll approximating $38,000,000 in the southern anthracite coal field, the company stated in another pamphlet message recently released to its employees, which bears the title "Profit Dollars and You."

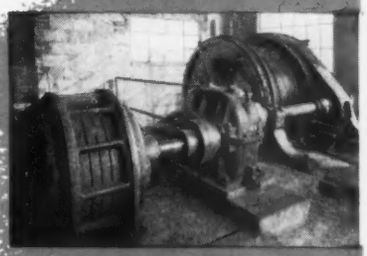
"Up in Hazleton," the pamphlet states, "the people recently raised $500,000 to present as an outright gift to a Mid-West manufacturing company that proposes to establish a factory in Hazleton to employ a maximum of 1,200 men with an

Jones HERRINGBONE SPEED REDUCERS

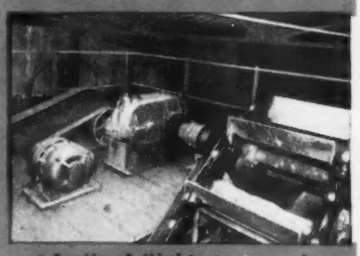
Catalog No. 70 of Jones Herringbone Reducers presents a vast amount of data relating to Herringbone Reduction Units. Illustrations show a broad range of herringbone reducer applications, and technical information shows how to select reducers for all conditions of service in accordance with the A.G.M.A. recommended practice.



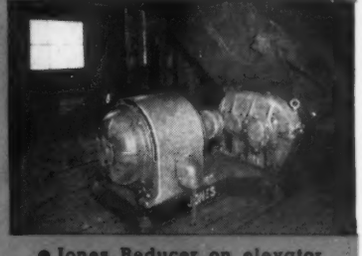
• This view of a Jones Triple Reduction Herringbone Speed Reducer typifies a line that is noted for advanced design, superior materials and precision workmanship.



• Jones Reducer on a Coal Mine Hoist.



• Inclined flight conveyor in coal tipple driven through Jones Reducer.



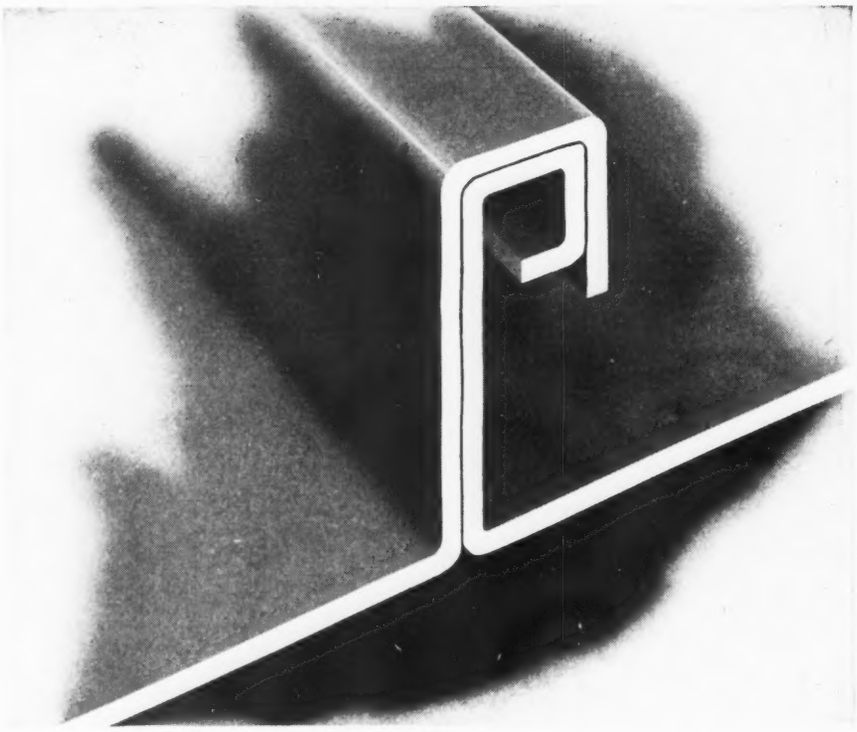
• Jones Reducer on elevator head shaft drive in coal mine.

In the Coal Industry

The illustrations of Jones Herringbone Speed Reducers shown at the right are typical of the many applications throughout the coal industry. One of the newest installations is at the Harmattan Mine of the Fairview Colleries Corporation where Jones Reducers are being used.

These reducers are built in a wide range of ratios and ratings to cover all requirements. All Jones Herringbone Reducers have heat treated gears, ground shafts and are mounted with antifriction bearings throughout. Cast iron bases are available for all variations of motor assembly.

W. A. JONES FOUNDRY & MACHINE CO.
4401 Roosevelt Rd., Chicago 24, Ill.



This Joint Gives Buildings "Old Age Benefits"

Here is simple, low-cost insurance against the time when ordinary buildings begin to sag and show their age. The patented, Armco joint withstands expansion, contraction and unequal settlement. It keeps Standard STEELOX Buildings trim and youthful.

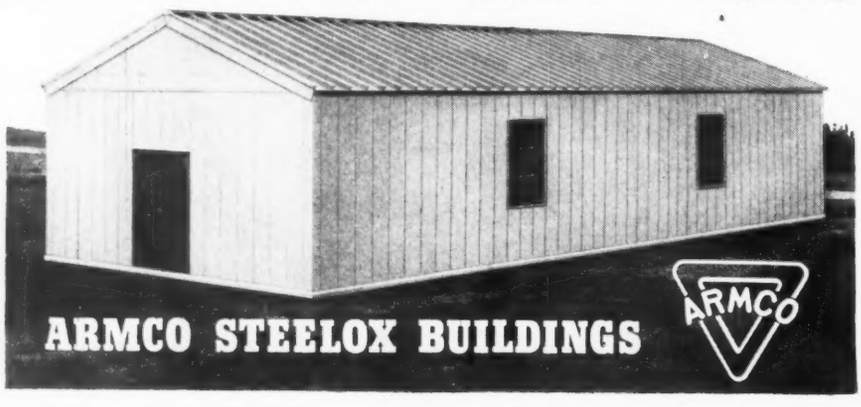
You'll also reap immediate benefits. With the revolutionary STEELOX method, the jointed panels provide both structural support and a finished surface. Erection is simplified, appearance improved and weathertight construction assured. Unskilled workmen quickly join the panels into a sturdy, maintenance-free structure.

There are other advantages in using STEELOX Buildings. They are made of Galvanized ARMCO PAINTGRIP Steel and can be painted immediately or left unpainted. STEELOX Buildings have the long life and low upkeep of a permanent structure, yet when necessary they can be quickly dismantled and re-erected at another site without loss of material. All parts are uniformly strong and the all-steel construction is an excellent fire-barrier.

STEELOX Buildings are prefabricated in a wide range of standard sizes to meet your requirements. Write for complete data. Armco Drainage & Metal Products, Inc., 2385 Curtis Street, Middletown, Ohio.

Check list for STEELOX Buildings

- ✔ Scale Houses
- ✔ Tool Houses
- ✔ Washrooms
- ✔ Time Offices
- ✔ Garages
- ✔ Lamp Houses
- ✔ Cap Storage
- ✔ Head Houses
- ✔ Pump Houses
- ✔ Blower Houses
- ✔ Engine Houses
- ✔ Utility Buildings



annual payroll approximating $3,000,000. Yet your company in 1946 provided employment directly, and indirectly through its subsidiaries, contractors, and lessees, to approximately 12,000 men, with an annual payroll of about $38,000,000. And we never asked one red cent from any industrial fund or anyone else, for that matter."

The message revealed that the company lost approximately $1 a ton on every ton of deep-mined coal and added that if it did not have stripping coal, which is mined at a lower cost, "then our 1946 report would have shown substantial losses for the company's operation.

"We point this out," the message continues, "in consideration of the fact that our reserves of stripping coal won't last forever. That's why we have been repeatedly saying that the key to our future success as a company and your future as an employee rests with your ability and willingness to increase our per man-day production of coal from our deep mines. Our annual report says that 'some improvement in productivity has been realized, although it falls far short of that necessary to avoid losses on underground mined coal.'"

Showing several examples of how P. & R. employees profit from the company's "profit dollars," the message cited formation of the Shen-Penn Production Co. at Shenandoah with an original investment of $1,000,000 and bank loans for an additional $3,000,000; construction of the two briquet plants at the central breakers; development of Pine Knot colliery near Minersville and Hunter Tunnel at Ashland; as well as numerous other improvements and developments at Maple Hill, Locust Gap, and other collieries. "None of these would have been possible," the message stated, "if the company had not operated at an over-all profit in 1946."

"As employees, then," the message concluded, "you can see where you profit from our profit dollars. Your future welfare is tied in directly with the welfare of your company. All we ask of you is your cooperation with us in those matters which are of vital concern to both you and us—such as increasing your man-day production. Remember, we are bound together in these particular matters. We will win together or we lose separately! Think it over!"

Personal Notes

Dr. Howard S. Turner, for the past 11 years associated with E. I. duPont de Nemours Co., Inc., Wilmington, Del., in research and development work, has been named assistant director of research and development, Pittsburgh Consolidation Coal Co., with offices at the company's research center at Library, Pa.

For the *Toughest* Service on Powered Wheels



for Logging, Construction, Mining

New Angle Pulling Power •
More Rubber • Greater Traction

Squeegee Power Cleats • Ejection Action

Snag-Resistant Tread and Sidewall •
Heavy Shock-Absorber Plies

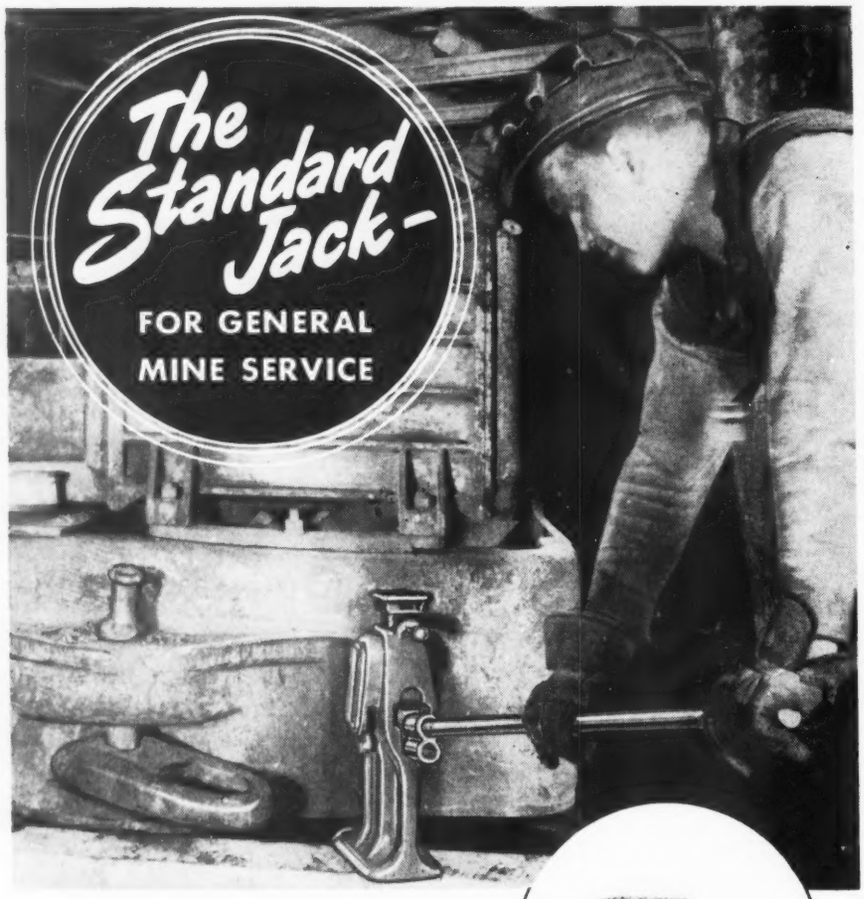
Buttressed Highway Rib •
Reinforced, Extra Heavy Beads

Natural Rubber Impact Cushion •
Deeper, Cool-Running Shoulders



The GENERAL L.C.M.

THE GENERAL TIRE & RUBBER CO. • AKRON, OHIO

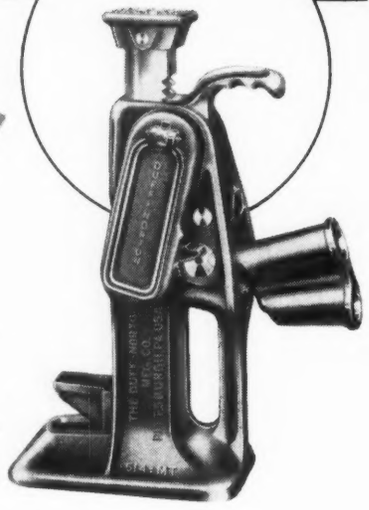


DUFF-NORTON'S

5 TON

AUTOMATIC

LOWERING JACK



When it comes to automatic lifting, lowering, and bracing of mine cars, monitor cars, coal loaders, cutters and other coal hauling and dumping equipment, Duff-Norton's 5 ton Automatic Lowering Jack has been a standard tool for many years. Load is instantly engaged by simple adjustment of foot lift to height required—no wasted motion—no lost jacking time. This jack is unexcelled for general mine service.

Available in 14, 16, and 21 inch heights for thin, medium, and thick seams. Write today for your copy of Bulletin 203-A and for our proposal on your jack requirements.

DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH 30, PENNSYLVANIA

There is a Distributor Near You

The retirement of three veteran officials has been announced by the Susquehanna Collieries Co., Nanticoke, Pa., effective May 1. **Michael F. Farrell, Sr.,** for the last 11 years safety inspector at No. 7 colliery, has served the company more than 36 years in various positions from fireboss to general mine foreman and safety inspector. **Thomas G. Williams,** electrical foreman at No. 7 colliery, first joined Susquehanna in 1919 as superintendent of electric line construction. **William H. Ruddick,** chemist, has been associated with the company for 54 years, holding various positions during that time.

J. R. Kirby, general manager, Red Jacket Coal Corp., Red Jacket, W. Va., has terminated his connection with the company. Mr. Kirby, who has been associated with the Ritter and Red Jacket organization for more than 30 years, has recently been confined by illness to his home at Emory, Va.

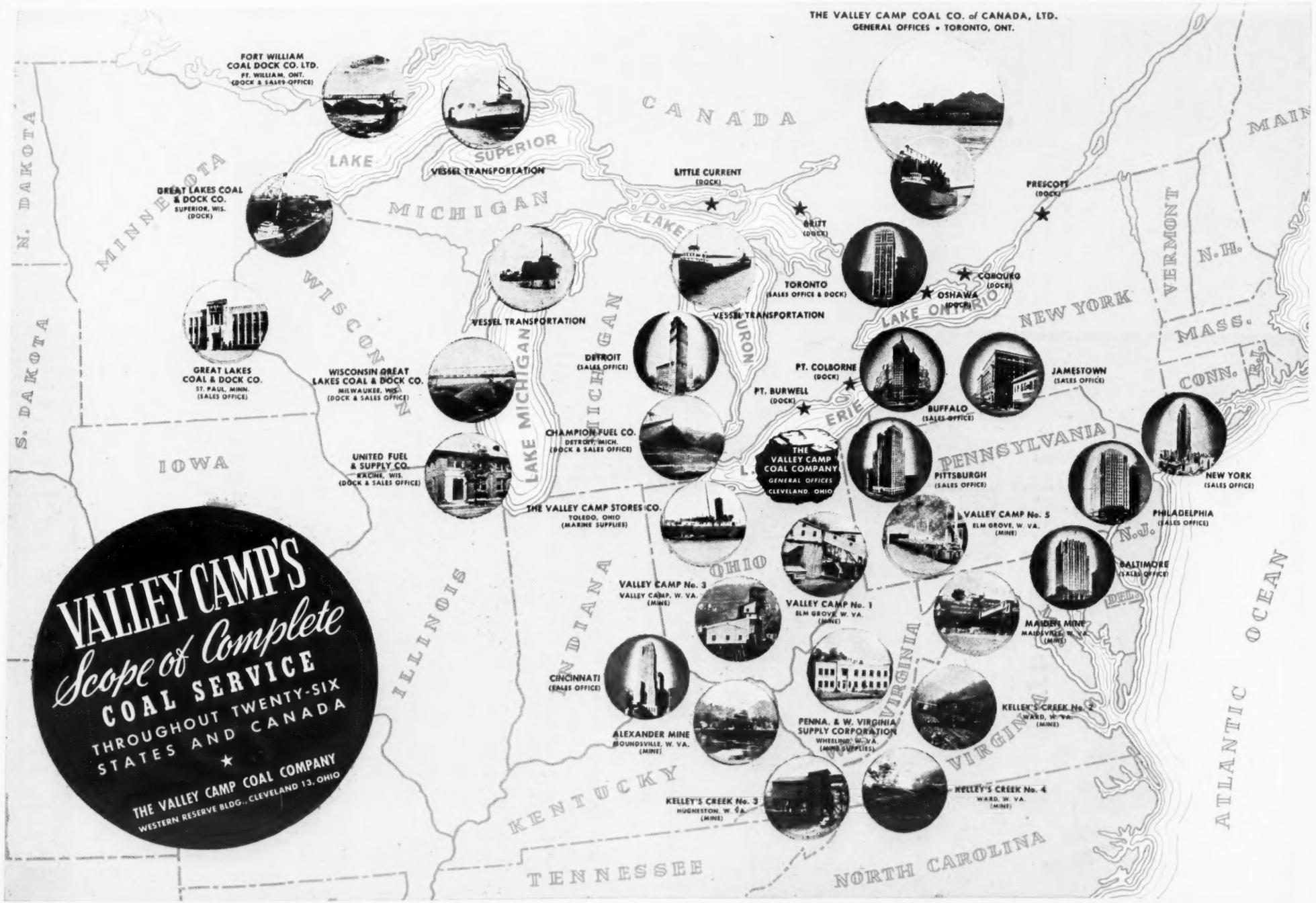
N. E. Bennett, general superintendent, Tioga Coal Corp., Tioga, W. Va., has resigned to develop the Otter Eagle Coal Co., near Swiss, Nicholas County, W. Va.

John B. Marchiando, former president of the Progressive Miners of America, has been appointed superintendent, Mine No. 2, Superior Coal Co., Gillespie, Ill.

Consolidation Coal Co. (W. Va.), Fairmont, W. Va., has announced changes in supervisory personnel at several of its operations. At Mine No. 32, Owings, **Wayne McCurcy** and **H. A. Patterson** have been promoted to section foremen; **C. W. Tarleton,** formerly section foreman at Mine No. 93, has been named assistant mine foreman; and **Frank Hardman** has been advanced to dispatcher on the third shift. **Kenneth Kincell,** formerly assistant mine foreman at Mine No. 32, has been transferred to Mine No. 63, Monongah, as assistant superintendent, and **H. O. Marquis** has been promoted from section foreman to assistant mine foreman at Mine No. 63.

Arlie A. Bragg has returned to his former position as mine foreman at Mine No. 97, Rivesville, after more than three years service in the armed forces. **Victor Securro,** who served as mine foreman during Mr. Bragg's absence, has been named section foreman at Mine No. 97. At Mine No. 98, Nora, **O. F. Allen** has been appointed assistant mine foreman, and **Frank P. Cunningham** and **Homer Fetty** have been made section foremen. **William H. Weaver** has been promoted to day-shift tipple foreman, and **Rex E. Wright** to night-shift tipple foreman, at Mine No. 98.

Henry T. DeBardeleben, president, DeBardeleben Coal Corp., Birmingham, Ala., has been elected chairman of the board of the organization, and **Henry F. DeBardeleben,** formerly ex-


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GENERAL OFFICES • TORONTO, ONT.
FORT WILLIAM COAL DOCK CO. LTD.
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(DOCK & SALES OFFICE)
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VALLEY CAMP, W. VA.
(MINE)
VALLEY CAMP No. 1
ELM GROVE, W. VA.
(MINE)
MAIDEN MINE
MAIDSVILLE, W. VA.
(MINE)
CINCINNATI
(SALES OFFICE)
KELLEY'S CREEK No. 2
WARD, W. VA.
(MINE)
ALEXANDER MINE
BOUNDSVILLE, W. VA.
(MINE)
PENNA. & W. VIRGINIA SUPPLY CORPORATION
WHEELING, W. VA.
(MINE SUPPLIES)
KELLEY'S CREEK No. 3
HUGHESTON, W. VA.
(MINE)
KELLEY'S CREEK No. 4
WARD, W. VA.
(MINE)
VALLEY CAMP'S
Scope of Complete
COAL SERVICE
THROUGHOUT TWENTY-SIX
STATES AND CANADA
★
THE VALLEY CAMP COAL COMPANY
WESTERN RESERVE BLDG., CLEVELAND 13, OHIO
CANADA
LAKE SUPERIOR
MICHIGAN
LAKE MICHIGAN
LAKE HURON
LAKE ONTARIO
LAKE ERIE
MINNESOTA
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IOWA
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MAINE
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NORTH CAROLINA
ATLANTIC OCEAN

MAKE A CUT...

IN MOTOR BURNOUTS



WHEN OVERLOADS DEMAND "SOMETHING EXTRA" from mine motors, make sure that they have something extra to protect them from overheating and burnouts. There's no better Class B insulation than Deltabeston* magnet wire. Many leading mines have made Deltabeston a standard specification for motor rewinding and repair.

The Deltabeston line of magnet wires includes both asbestos and glass-insulated types, round, square, and rectangular, in a full range of sizes. It is the product of top-rank experience in heat-resistant wire. Our engineers can give you practical, point-of-use advice for any combination of operating conditions. Deltabeston wires and cables are widely available when you need them.

For complete information on Deltabeston magnet wire and other products "built to beat the heat," write Section Y50-614, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Connecticut.

DELTABESTON MAGNET WIRE

**Trade-mark Reg. U.S. Pat. Off.*

GENERAL ELECTRIC

ecutive vice president and general manager, has been elected president. Named vice presidents at the recent election were **Newton H. DeBardeleben, Alvin W. Vogtle,** and **Thomas J. Carpenter. John W. Crawford** was named secretary-treasurer and **Lee G. Lowe,** assistant secretary-treasurer.

Argie Miller, Benham, Ky., has been appointed a Kentucky State mine inspector, to cover Harlan, Letcher, Perry, Pike and Floyd Counties.

James M. Sisson, Oliver Springs, Tenn., has been appointed a state district mine inspector for Overton, Fentress and a part of Anderson Counties, Tennessee.

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Obituary

Archie T. Iddings, 52, assistant general manager of the Page Coal & Coke Co., Pageton, W. Va., since 1937, died May 4 at his home in Pageton, following a heart attack. Previous to his association with the Page organization, Mr. Iddings was for many years connected with the Crozer Land Co.

H. L Good, 67, operating vice president, Westmoreland Coal Co., Irwin, Pa., died suddenly May 16, while returning to Irwin by motor after attending a meeting of the Western Pennsylvania Operators' Association. He had been associated with the coal mining throughout his entire career and was widely known in the industry.

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Stove Company Issues Small Homes Booklet

A plan book for small homes designed for heating with a coal heater has been published by the Locke Stove Co., Kansas City, Mo. Homes sketched in the booklet were designed by a nationally known architect for low-cost construction and low-cost heating.

The booklet is being made available to retailers by the Sinclair Coal Co., Kansas City, on a cooperative cost basis.

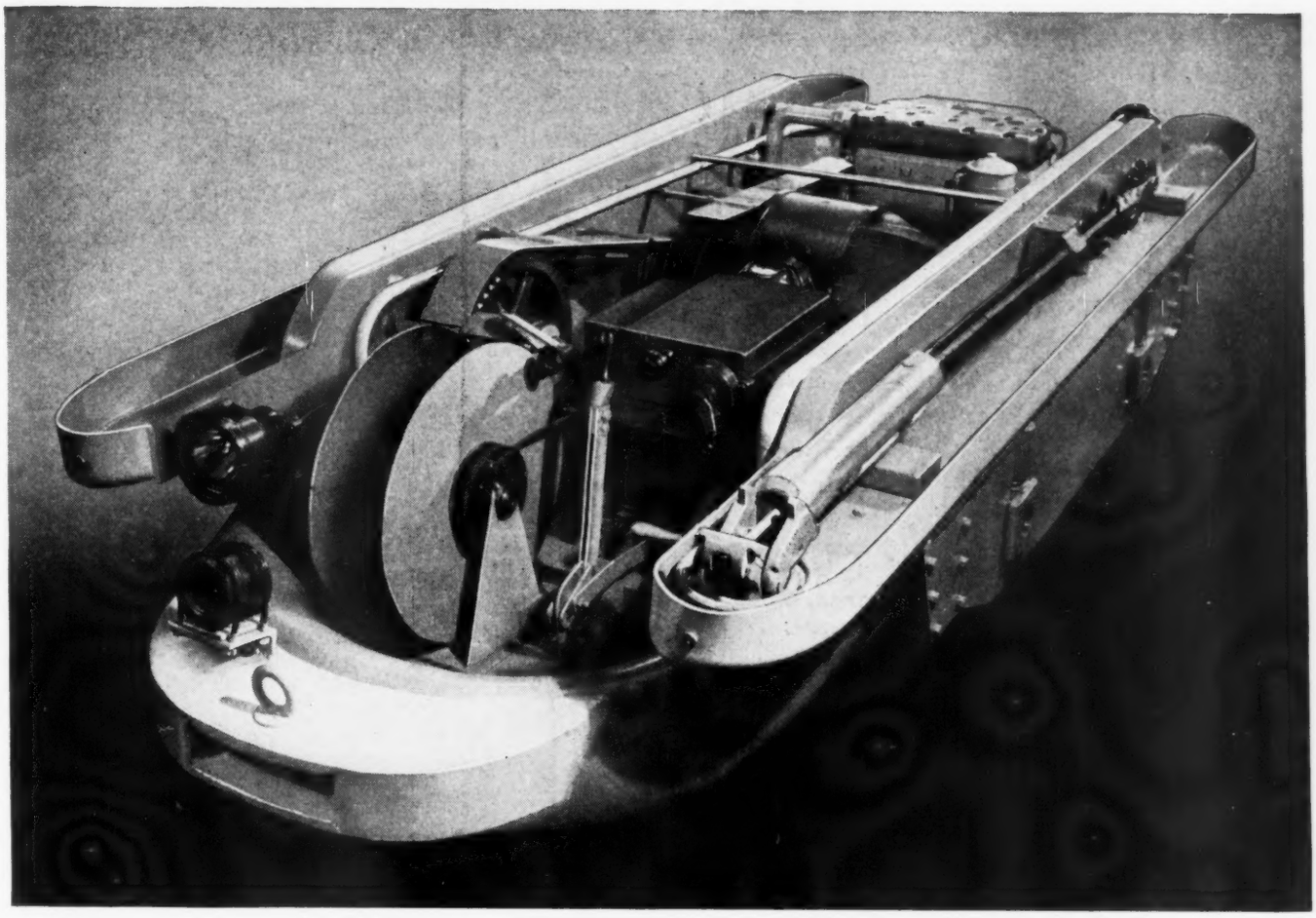
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Preparation Facilities

Gay Coal & Coke Co., Mt. Gay, W. Va.—Contract closed with Kanawha Mfg. Co. for Kanawha-Belknap calcium-chloride washer to prepare 6x3-in. egg; capacity, 40 t.p.h.

Imperial-Cardiff Coal Co., Blacklick Township, Cambria County, Pa.—Contract closed with Jeffrey Mfg. Co. for tipple; capacity, 175 t.p.h., raw-coal feed, run-of-mine.

H. C. Frick Coke Co., Robena mine,



ONE OF CANTRELL'S FIVE COMPRESSORS WILL MEET YOUR REQUIREMENTS

1. THE CANTRELL TYPE "SP", Self-Propelling air compressor pictured above is actually a heavy duty air compressor and two-ton locomotive combined. It takes you to the job . . . does its work and returns . . . all under its own power . . . freeing heavy locomotives and crews for other work.

2. THE TYPE "MC", Mine Car compressor. is a complete heavy duty air compressor built for travel in a train of cars or with separate locomotive.

3. THE TYPE "C-1" compressor is a complete heavy duty air compressor mounted in a special steel body with rubber tired wheels for trackless coal mining use.

4. THE MODEL "S-L" is a complete heavy duty air compressor mounted on a steel frame base ready for installation in a mine car or for shop use. This model is also sold without motor, with adjustable motor base for installation of your own power unit.

5. THE MODEL "S-101" is the basic compressor unit used in all types and models of the Cantrell line. It is furnished without motor or air receiver.

Built for rugged, dependable service, these five models have made the name Cantrell well known wherever compressors are used. Why not write today for complete information on the Cantrell Line of air compressors.

Cantrell COMPRESSORS

IMPERIAL-CANTRELL MFG. CO.. JELLICO, TENNESSEE

NEW LIFE FOR OLD CABLES

7 Point Superiority



1 Double grip . . . both sides adhesive.

2 Great tensile strength . . . tough.

3 Won't tear, ravel or pucker.

4 Resists abrasion.

5 Acid- and alkali-proof.

6 Extra thick . . . one layer insulates.

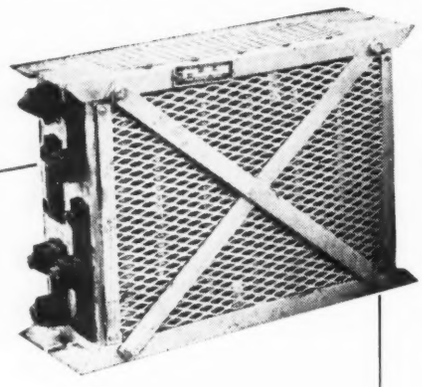
7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

RUBEROID

INSULATING TAPE

The RUBEROID Co., Executive Offices, 500 Fifth Avenue, New York 18, N. Y.

An external frame, supporting the helical coils in G. M. C. Resistances prevents damage due to jolts and vibration . . . thus insuring longer useful life. Added protection includes a shield to protect coils from ouside injury. The coils are highly resistant to damage from mine water and mill fumes. Insulators are of a type not affected by sudden changes in temperature. For a really sturdy resistance unit, choose G. M. C.!



Protected Construction lets G. M. C. Resistances do a better job, longer!

Guyan Machinery Company

Logan, West Virginia

Greene County, Pa.—Contract closed with Deister Concentrator Co. for eight No. 7 SuperDuty Diagonal-Deck coal-washing tables. These eight tables, recently shipped, are part of total of 48 tables to be installed eventually in the Robena cleaning plant.

Delta Collieries Corp., Delta mine, Marion, Ill.—Contract closed with Templeton-Matthews Corp. for conveying, crushing and screening equipment as addition to existing plant to provide facilities for reducing 200 t.p.h. of washed coal to stoker size.

Valley Camp Coal Co., Mine No. 3, Elm Grove, W. Va.—McNally Pittsburg Mfg. Co. has advised that the plant description appearing in *Coal Age*, March, p. 142, was in error. The correct description is as follows: Contract closed for one McNally-Norton primary washer, one McNally-Norton rewasher for middlings, one McNally-Pittsburg 24x36-in. double-roll crusher and one McNally-Pittsburg centrifugal pump; to wash run-of-mine, crush middlings and rewash, classify to 5x2-, 2x1¼-, 1¼x⅝- and ⅝x0-in.; ⅝x0 fine coal to be recovered and dewatered, for mixing; capacity, 215 t.p.h. of 5x⅜-in. run-of-mine, with provision to increase to 315 t.p.h. of 5x0-in.

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Coal Publications

Exploration of Lookout Mountain and Sand Mountain Coal Deposits, Dade and Walker Counties, Georgia, by J. R. Troxell. U.S. Bureau of Mines, R.I. 3960. Free. Data from eight drill-holes on Lookout Mountain and 14 holes on Sand Mountain.

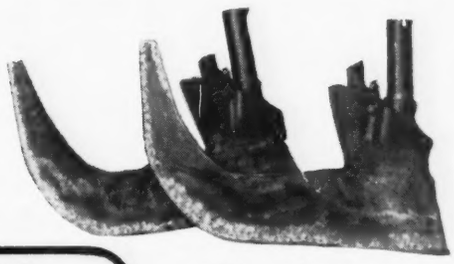
Coking Coal Deposits on Lookout Mountain, DeKalb and Cherokee Counties, Alabama, by D. M. Coulter. U.S. Bureau of Mines, R.I. 4030. Free. Upper Cliff No. 1 seam on Lookout Mountain is suitable for byproduct-oven coking whether used alone or blended with high-volatile coal, and thus can replace low-volatile coals now obtained from other states. Included are detailed analyses of Upper Cliff No. 1 seam, along with results of tests on a few other coals in the vicinity.

Churn-Drill Performance, by J. R. Thoenen and E. J. Lintner. U.S. Bureau of Mines, R.I. 4058. Free. Tentative conclusions from a study of factors affecting churn-drill performance show that drill speed or a change in the number of strokes per minute and the sharpness of the cutting edge of the drill bit had only a minor effect. Lengthening the stroke appeared to increase only the initial performance. Added tool weight and an increase in bit diameter improved operation only up to a point and mechanical efficiency seldom exceeded 20 percent. For best

AN OUNCE OF PREVENTION . . .

PARTS HARD FACED BEFORE USE HAVE UP TO 500% GREATER SERVICE LIFE





41%+ . . . Corn planter plows gave 41% more service when hard-faced with Amsco No. 459.

USE AMSCO HARD-SURFACING WELDING RODS

. . . hard surface one part and let it do the work of two, four, or more — in farm implements, construction equipment, or any other machinery where parts are subject to impact and abrasion. A hard-surfaced plow share turns over 165 acres of sandy soil — unsurfaced in the same soil; only 12 acres.

Look at these examples of savings made possible by hard-facing new parts with Amsco rods or electrodes. Send for bulletin 941-W — it describes Amsco's complete line of conservation welding products.

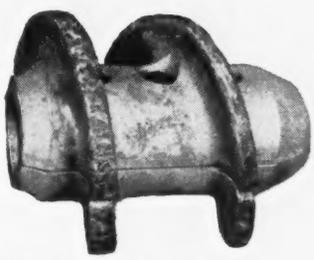
AMSCO



400%+ . . . Shovel at left surfaced with Amsco 217 shown after plowing 500 acres. Unsurfaced shovel at right after 100 acres.



100%+ . . . Pugmill knives gave better than 6 days' service when hardfaced with Amsco Economy Hardface — gave only 3 days' service when surfaced with other rod.



500%+ . . . Cast iron brick machine part gave over one year's service after hardfacing — ordinary service 2 months.



Cullet pulverizer hammers protected when new by thin coat of Amsco No. 459 — polishes in service, retards wear.





300%+ . . . Brick machine die ring gave 4 times more service when hardsurfaced with No. 459 Amsco Rod.



Corn-cob crusher rolls protected with Amsco No. 459 give better service with less repair than when coated with higher priced hard-surfacing rod.



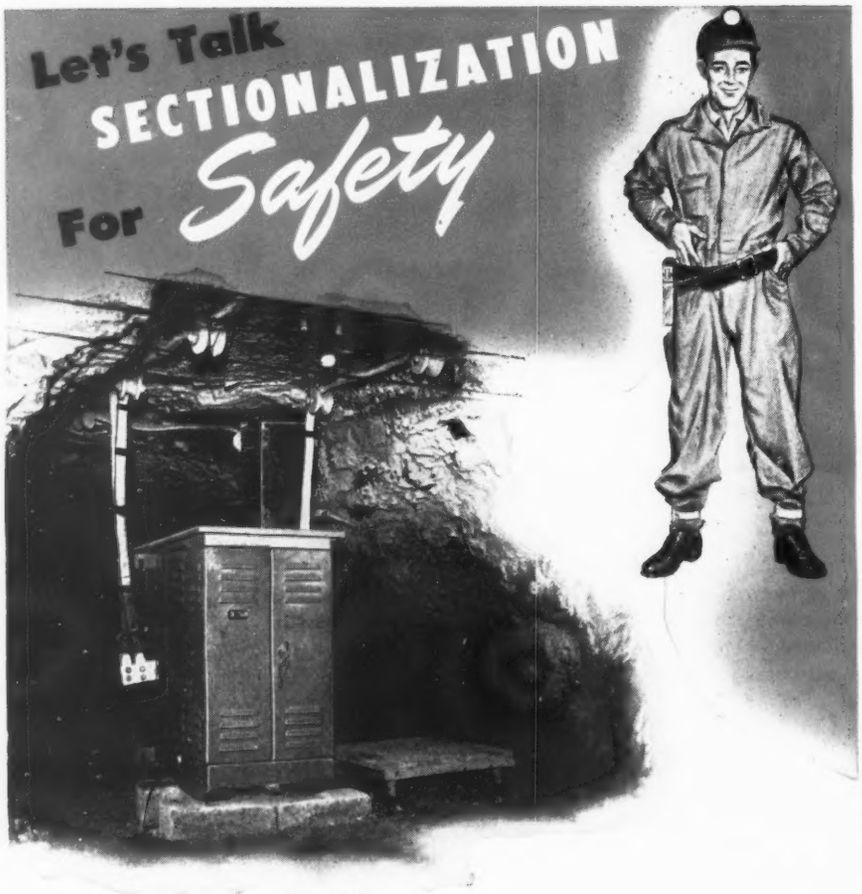
199%+ . . . Cultivator spades cultivated 185 acres after hard-facing with Amsco 459 — unsurfaced, only 62 acres.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

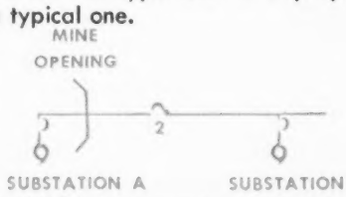
Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.

Offices in principal cities. Made and sold in Canada by Canadian Ramapo Iron Works, Inc., Niagara Falls, Ont.



By SECTIONALIZING your mine electrical distribution system—and protecting each section with I-T-E Type KSC Automatic Reclosing Circuit Breakers—you can provide adequate protection against mine disasters that result from electrical faults.

There are a number of applications for the Type KSC in a properly sectionalized mine. Let's consider a typical one.



In the tie-line application at right, the KSC is installed in the circuit between each two substations at a point where the resistance between each station and the circuit breaker is approximately the same. In this case, the function of the KSC is to prevent distantly located stations from feeding into a fault and spreading trouble.

I-T-E Type KSC Automatic Reclosing Circuit Breakers protect your mine in many other ways. Find out how by contacting the I-T-E Mining Specialist in your neighborhood. He will be glad to make an application analysis of your mine electrical distribution system. Use him—at no obligation. I-T-E Circuit Breaker Company, 19th and Hamilton Streets, Philadelphia 30, Pa.

Be Wise SECTIONALIZE

Send for Bulletin 4611 and get complete details on I-T-E Automatic Reclosing Circuit Breakers.

1ST OF A SERIES ON RECOMMENDED SECTIONALIZING PRACTICE USING THE KSC.

I-T-E SECTIONALIZING Switchgear

results, specific gravity of the drill sludge should be about 70 percent of that of the rock being drilled. Different performance characteristics when using steel and manila cables were observed.

Design and Operation of the Coal Planer, Ruhr District, Germany, by John W. Buch. U.S. Bureau of Mines, I.C. 7377. Free. A wartime development in mechanical mining, discovered by Bureau technicians on a special mission to study European mines. The planer provided a drastic change in accepted longwall methods and stabilized coal production in spite of wartime shortage of manpower in the Ruhr area. It operates in either direction, shearing a 12-in. cut from the lower third of the longwall face and loading planed coal and loose coal in one operation. The upper two-thirds of the seam either caves or is barred down and is loaded on the return trip. Included are illustrations of the planer and other mechanical equipment, as well as a description of conventional mining methods in the Ruhr.

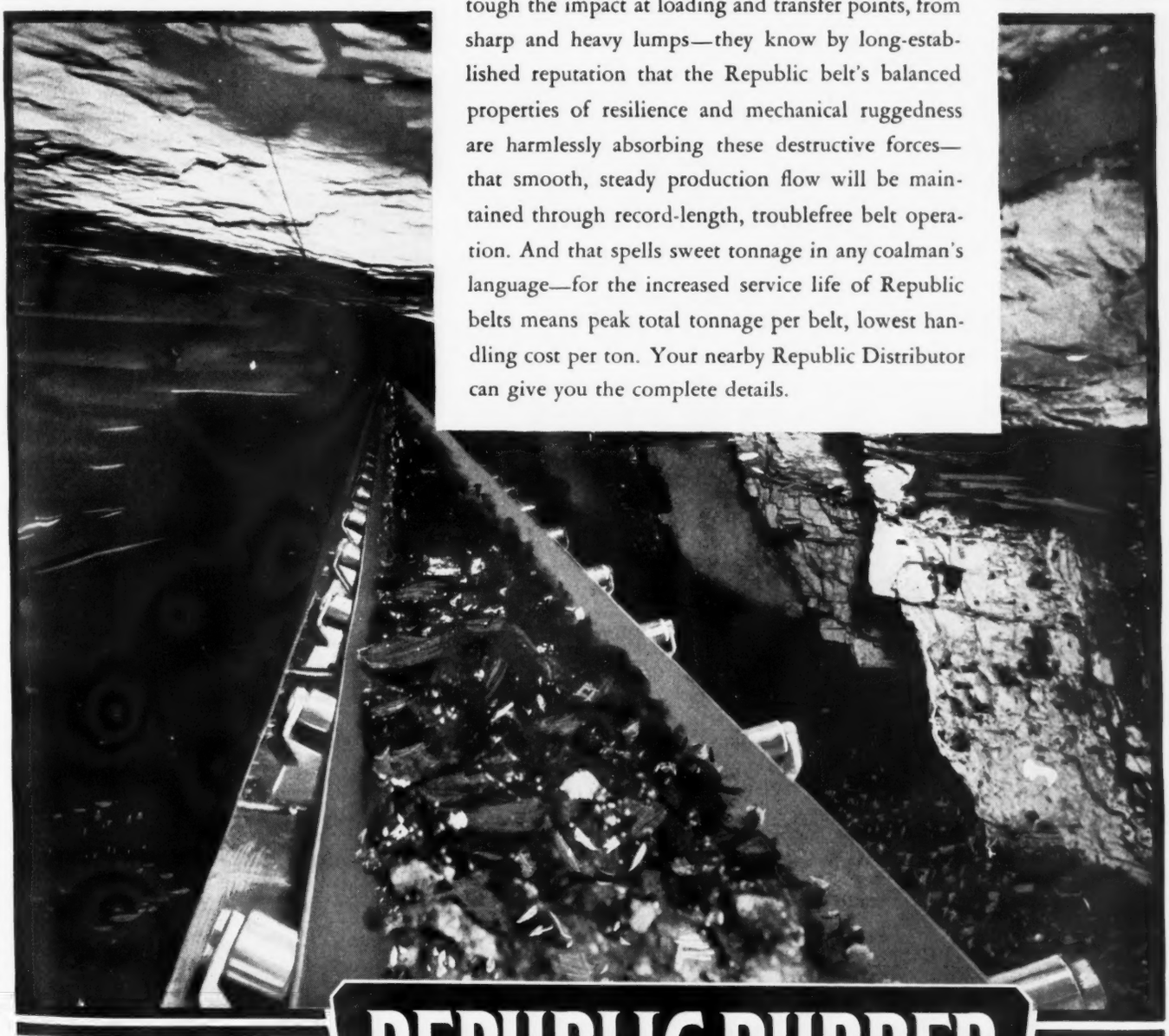
Carbonizing Properties of Elkhorn No. 3-Bed Coal from Wheelwright Mine, Floyd County, Kentucky, by D. A. Reynolds, J. D. Davis, R. E. Brewer, W. H. Ode and D. E. Wolfson. U.S. Bureau of Mines, T.P. 697. 41 pp.; 5¾x9¼-in.; paper. Price, 15c., Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C. Results of Bureau of Mines-American Gas Association tests to evaluate oxidizing, expansion and agglutinating characteristics of coals. It was found that a blend containing as much as 30-percent Pocahontas No. 3 coal with 70-percent Elkhorn No. 3 coal may be carbonized safely in by-product ovens if moderate charge densities are maintained.

Diesel Equipment in Underground Mining, by D. Harrington and J. H. East Jr. U.S. Bureau of Mines, I.C. 7406. 87 pp. plus 14 pp. of illustrations; 8x10½-in.; paper; mimeo. Free. Diesel mine locomotives and other diesel equipment can be used in underground mines with reasonable safety if proper precautions are taken. In many instances, diesel mine locomotives are believed to be safer in coal and non-coal mines than electric trolley-type locomotives, because of the hazards of the trolley system. In addition, use of diesels promises over-all operating economy. When American manufacturers develop diesel engines for safe and efficient underground use, this type of power probably will have many applications in coal and other mines.

Coal Preparation Practice in Western Germany, by Thomas Fraser and M. G. Driessen. Office of Technical Services, Report PB-48438, U.S. Dept. of Commerce, Washington 25, D.C. 123 pp. Price: photostat, $9; microfilm, $3. Comprehensive summary of methods and machinery, some of

FLOW GENTLY SWEET TONNAGE

MINE OPERATORS sing a new version of a grand old song when their underground haulage conveyors are equipped with Republic Belting. No matter how tough the impact at loading and transfer points, from sharp and heavy lumps—they know by long-established reputation that the Republic belt's balanced properties of resilience and mechanical ruggedness are harmlessly absorbing these destructive forces—that smooth, steady production flow will be maintained through record-length, troublefree belt operation. And that spells sweet tonnage in any coalman's language—for the increased service life of Republic belts means peak total tonnage per belt, lowest handling cost per ton. Your nearby Republic Distributor can give you the complete details.



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111 DEAD IN WORST COAL MINE DISASTER

SAFETY PAYS—The newspaper reports of the recent explosion in Centralia, Illinois, call attention to the need for the latest safety measures in coal mining. Our trained inspectors and engineers are available to all of our assureds and careful compliance with their recommendations can prevent needless loss of life. For years, operators and miners both have benefited from the safety engineering measures suggested by our staff. May we help with your insurance problems?



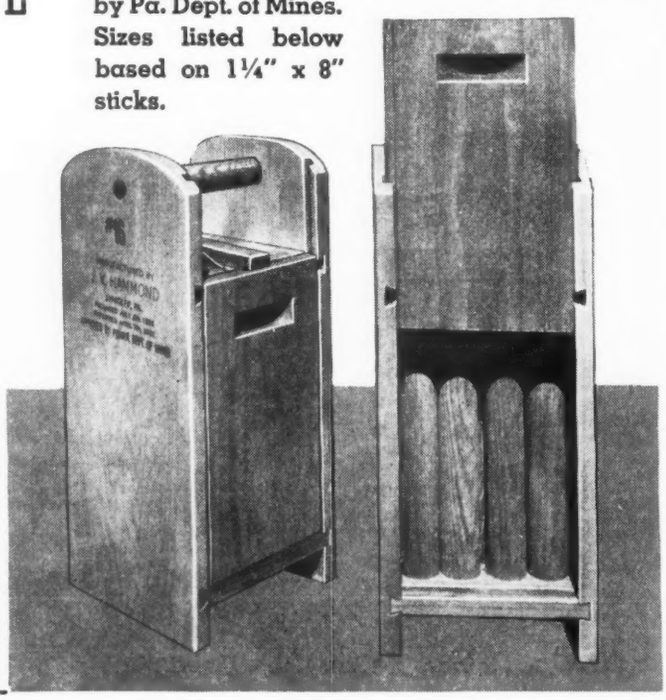
COAL OPERATORS CASUALTY COMPANY

GREENSBURG, PENNSYLVANIA

SAFETY EXPLOSIVE BOXES ... latest type-all wood

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Sizes listed below based on 1¼" x 8" sticks.



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No. 12 Powder Box, 16 stick size..$1.85
No. 16 Powder Box, 16 stick size..$1.60
No. 20 Powder Box, 20 stick size..$2.10
No. 36 Powder Box, 36 stick size..$3.60
No. 50 Powder Box, 50 stick size..$4.40
No. 72 Powder Box, 72 stick size..$5.20
No. 6 Detonator Box, 2½x3x6 inside $1.20
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Special Sizes Made to Order

Patented July 8, 1924.
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J. V. HAMMOND CO. SPANGLER, PA.

which may be adaptable to American use. Extensive jigging of fine coal, dedusting of fine coal before washing and intensive purifying methods for obtaining super-clean electrode coal are described. Graphs, tables, flow charts and drawings.

The Prevention of Coal Dust Explosions: Part I, The Effect and Manner of Distribution of Stone Dust, by S. Jones and F. V. Tideswell. Ministry of Fuel & Power, Safety in Mines Research Board, Paper No. 105. H. M. Stationery Office, London, 1947. 24 pp.; 6x9¾-in.; paper. Price, 6d. net. Danger of explosion may arise if coal and rock dust are imperfectly mixed or if coal dust forms an overlay on the rock dust. To avoid this danger, rock dust should be spread "little and often" to provide good mixing with coal dust and statutory examining and sampling of mine-road dust should be supplemented frequently by visual examination of the surface dust to see that coal and rock dust are well mixed.

Mining Methods, Ruhr Valley—Nine reports describing mining methods in Germany's Ruhr valley recently have been released by the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. Orders should be accompanied by check or money order payable to the Treasurer of the United States. The publications are listed below:

PB-32160: Technical Report on the Ruhr Coalfield, Vol. I. Microfilm, $2; photostat, $5. Volumes II and III, with illustrations, appendices and reports, have not yet been received by OTS.

PB-49217: Winding Engine Manufacturers' Association Report on Winding Engines in Germany. Microfilm, $4; photostat, $11.

PB-19267: Investigation of Koepe Winding Practice in the Ruhr District of Germany and the Limburg District of Holland. Microfilm, $1.50; photostat, $8.

PB-79: Report on Coal-Stripping Method and Equipment in Germany. Mimeographed. 10c.

PB-4344: Operation of the Coal Planer, Mine Hannover-Hannibal (Krupp), Essen-Ruhr. Microfilm, 50c.; photostat, $1.

PB-4464: Operation of the Coal Planer, Mine Friedrich-Heinrich, Steinkohlenberg-Werk, Lintfort-Lower Saxony. Microfilm, 50c.; photostat, $1.

PB-4345: Present Status of Coal Shearing-Machine Design, Heinrich-Korfman Jr. Maschinenfabrik, Witten-Ruhr. Microfilm, 50c.; photostat, $1.

PB-4359: Manufacture of Widia Bits for Chain Coal-Cutting Machines, Widia (Krupp) Tool Works, Essen-Ruhr. Microfilm, 50c.; photostat, $1.

PB-23755: Mining Method for a Five-Foot Seam, Pitch 25 Deg. to 50 Deg. at Mine Fritz, Hoesch A.G., Essen-Ruhr. Microfilm, 50c.; photostat, $1.



***Face Safety Circuit Centers**

MINES *Safety Circuit Center*

POWER DISTRIBUTION SYSTEMS

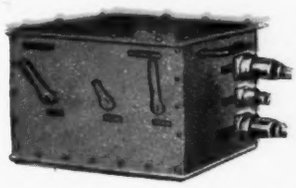
Designed to deliver *maximum* available power through *minimum* lengths of sectionalized cable – thereby making it possible to deliver, in an approved manner, the rated capacity of work from all mining machinery. This results in safety to personnel and equipment. It also reduces costs and improves production. Among many other exclusive MINES features are–

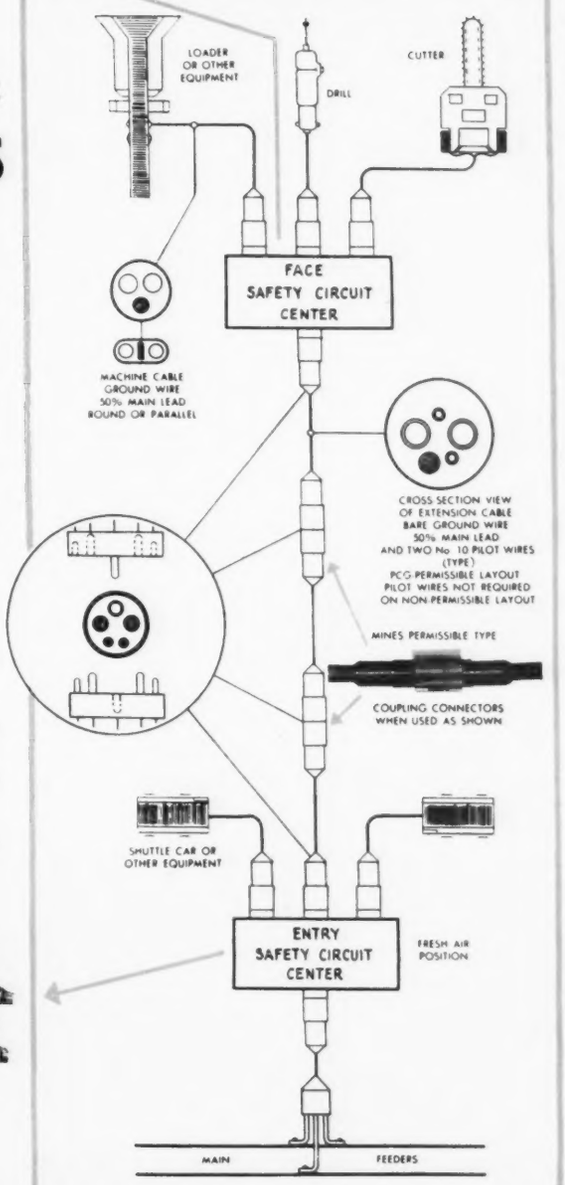
- Connectors drop load in process of opening – *eliminating* power arcs.
- Fast acting Circuit Breakers are confined in explosion-tested housings.
- Power is fully restored *without* opening breaker compartment. Stay permissible in operation. No tools or parts required to restore power.
- Available for A.C. or D.C. conventional mine voltages.
- Current trip (optional) cuts power off when cable or machine insulation fails.

For *maximum* protection to personnel and equipment you won't go wrong when you adopt the MINES POWER DISTRIBUTION SYSTEM. *Get all the facts* — send for your copy of our bulletin SCC 100 TODAY.

JOY MANUFACTURING COMPANY, EXCLUSIVE DISTRIBUTORS TO MINING INDUSTRY

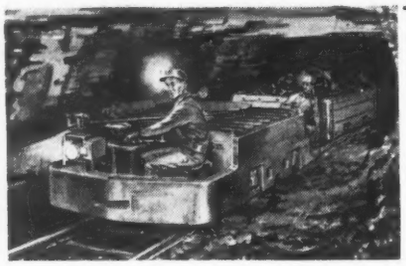






MINES EQUIPMENT COMPANY

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Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

Scraper Hydraulic Units

Two new hydraulic conversion units that permit operation of 2- and 4-yd. scrapers with D-2 and D-4 tractors equipped with hydraulic dozers have been announced by LaPlant-Choat Mfg. Co., Inc., Cedar Rapids, Iowa. Designed for hooking into existing hydraulic systems, the units make it possible to operate a 2- or 4-yd. scraper in combination with present dozers without having to purchase an additional hydraulic system for scraper operation.

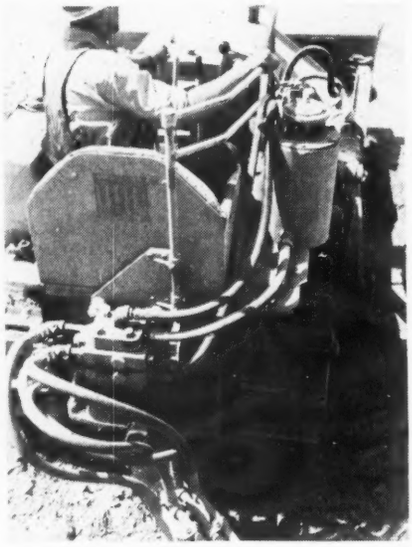
The conversion units are available in two designs—one for adapting the new 2-yd. LaPlant-Choate scraper to present D-2 hydraulic dozers and the other for adapting the 4-yd. scraper model to D-4 dozer units. The same assemblies can also be used effectively on other makes of hydraulic tractor-dozers equipped with front-mounted pumps and four-position valves, as long as the capacity of the pump and horsepower of the tractor are adequate for scraper performance.

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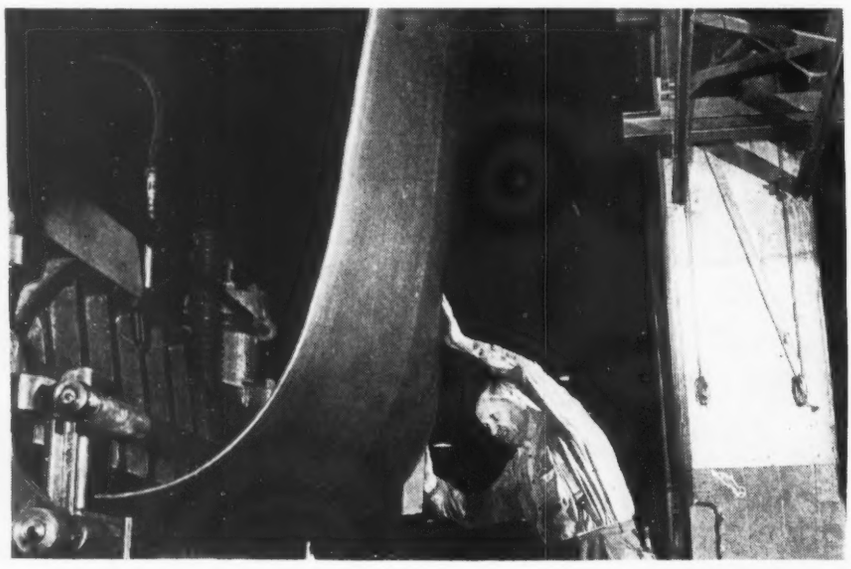
Rubber Conveyor Belt

A new conveyor belt 250 to 400 percent stronger than previous rubber-fabric belts has been announced by the United States Rubber Co., Rockefeller Center, New York.

Especially designed for use in mines and other important material-handling operations, the new-type belting owes its increased strength to a revolutionary new textile construction of nylon and Ustex yarn that increases the permissible working tension of each ply 2½ times and permits the use of more plies, according to the manufacturer. Lower maintenance costs and improved efficiency of material-handling equipment is expected from the belt, the company states. It will carry heavier loads than other rubber-fabric belts, thus extending the range of conveyors, and eliminating many costly transfer points and extra driving mechanisms.



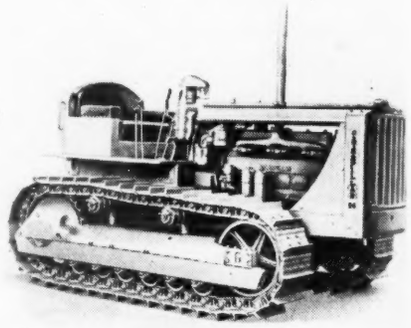
In addition to greater strength, the new belt has the advantages of low stretch lengthwise and increased flexibility crosswise, which makes it possible to build a longer and heavier belt with a minimum of stretch and excellent troughing qualities, it is said. The belt can be spliced easily and quickly, and in the event of accidental damage, repairs can be made promptly by conventional repair techniques.



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Diesel Engines, Tractors

Two diesel engines, and two track-type tractors and two motor graders powered by these engines have been announced by Caterpillar Tractor Co., Peoria 8, Ill. Increased power, improved design, new and stronger materials and the results of more than five years of research are incorporated in these post-war replacements for the six popular models and permit them to handle increased power assignments more efficiently, rapidly and economically, according to the manufacturer. Included in the new machines are the four-cylinder D315 and the six-cylinder D318 engines, new D4 and D6 tractors and new diesel No. 12 and No. 112 motor graders.



The D315 engine replaces the D4400 engine and the D318 replaces the D4600 engine in the Caterpillar line, providing one-third greater power output than the previous models, it is said. The D315 engine has a maximum output, with radiator fan and full equipment, of 70 hp., while the D318 is similarly rated at 105 hp., with both available as industrial units and electric sets.

The new D6 tractor develops 65 drawbar horsepower and 75 belt horsepower, an increase of 10 hp. over the previous models. The new D4 tractor, with 43 drawbar horsepower and 48 belt horsepower, offers a 20 percent increase in work power over the model it replaces. Increases are carried into the new motor graders, the new diesel No. 12 offering 100 hp. and the new diesel No. 112 developing 70 hp. This capacity is

Increase your production 33%

with equivalent steel tonnage

USE J&L OTISCOLOY

HIGH-TENSILE STEEL



The elimination of 25% of the dead-weight of many products is possible through use of J&L Otiscoloy High-Tensile steel instead of carbon steel. Several manufacturers have taken advantage of this saving in weight and with Otiscoloy are producing one-third more units per ton than with an equivalent tonnage of carbon steel. Write for information on how to increase your unit production with less steel.

J&L STEEL

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. . . AND YOU'RE BOUND TO WIN

WITH **MESCOWELD**

RAIL BONDS



Type M9-F



Type M8-F



Type M10-F

No matter what type of MESCOWELD Rail Bonds you specify (and there are eighteen different types to choose from), you can be sure that you are getting the best rail bond for your job. MESCOWELD Rail Bonds are soundly engineered from start to finish. The "flashweld" method of attaching terminals to cables insures a more oxygen-free weld . . . thereby increasing conductivity and mechanical strength and minimizing corrosion when in service.

Take the gamble out of your rail bond performance—specify MESCOWELD. Write or telephone for complete information.

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ELECTRICAL
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MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-leak transmission. Use regular auto oil; change every 6 months.



Extra-long journal springs assure better trackability.
Large motor, to assure more horsepower per ton weight of locomotive.
Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons – either single or double motor-drive – 16" to 56½" track gauge.

All Greensburg Locomotives are **CUSTOM-BUILT** *to your requirements*

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.

FLEXIPIPE
The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

Write for free sample and full information

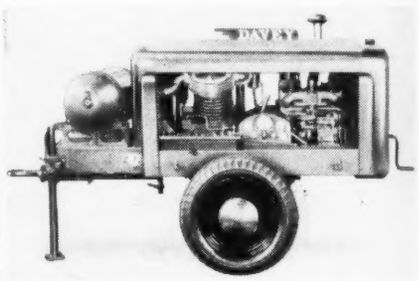
BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.

said to place the Diesel No. 12 in a new class in the grader field with new application opportunities, while the Diesel No. 112 now qualifies to handle much of the work hitherto reserved for the largest size motor grader.

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Compressors

To mark the anniversary of its introduction of the world's first air-cooled portable compressor, the Davey Compressor Co., Kent, Ohio, has announced a complete new line for 1947, which includes five models in 60-, 105-, 160-, 210- and 315-c.f.m. capacities. All units are of V-type cylinder design, except the Model 315. The latter is of "W" construction with four low-pressure and two high-pressure cylinders. Units operate at relatively slow piston speeds through the use of short piston strokes (4½ in. for Models 60 and 105; 4 in. for Models 160, 210 and 315).



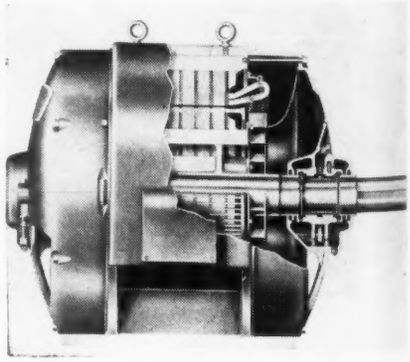
The new compressors are available in industrial departmental, skid, steel-wheel, pneumatic-tired-trailer and flanged-wheel units for mine and railway work. They are also manufactured as "Auto-Airs" for truck mounting in conjunction with Davey heavy-duty power take-offs and as "Track-Airs" for tractor mounting. A new Model 60 V portable compressor available for various services also has been announced.

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Electric Motors

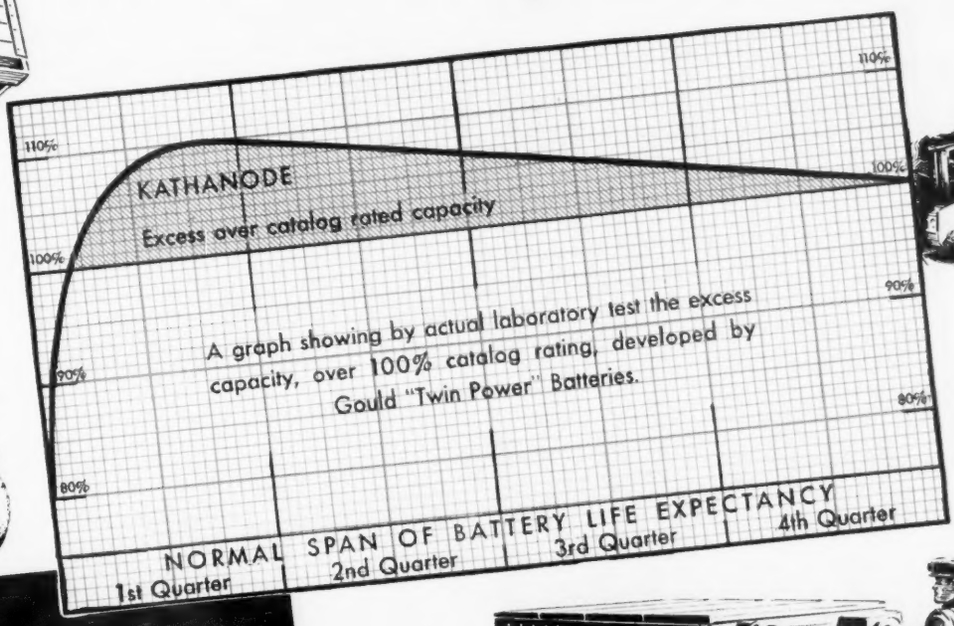
Announced as newly available by the Electric Machinery Mfg. Co., Minneapolis 13, Minn., are heavy-duty squirrel-cage induction motors from 100 to 1000 hp., 1800 r.p.m. and lower speeds, designed for drip- and splash-proof construction, and "Heavy Duty" splash-proof synchronous motors for constant-speed drives up to 1,000 hp.

Both types of motors are said to



GOULD "Twin Power" PROVIDES EXTRA CAPACITY



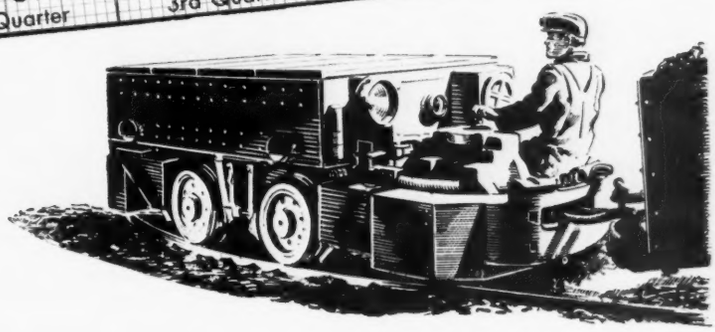






How Far Apart are Atoms?

This is an X-Ray Diffraction Unit. In the Gould Research Laboratory it produces lines on a photographic film, used to calculate distances between atoms on the substance under test. For Gould this instrument gives information that is not obtainable in any other way. It reveals physical structures important in solving battery problems.



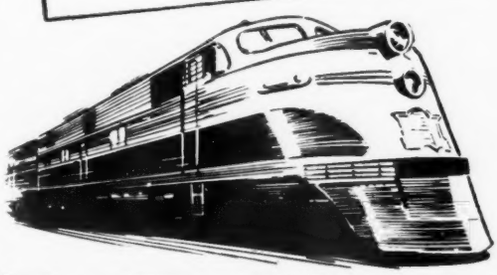
More tonnage is moved when mine locomotives and shuttle cars are equipped with GOULD "Twin Power" BATTERIES

In Gould batteries the glassklad construction retains active material in the grid framework despite vibration and hard use. Less space is required for sediment chambers. More space is available for higher capacity plates.

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In mine locomotives and shuttle cars, on railroad Diesel engines, in electric industrial trucks—wherever there is a need for extra power—Gould batteries give lasting service. Write for Catalog 200 on Mine Locomotive Batteries, or Catalog 300 on Mine Shuttle Car Batteries.

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.



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elevator buckets
of any type



Hendrick will fabricate to specifications elevator buckets of any desired size, shape and capacity; plain or perforated, riveted or welded; to handle either wet or dry material.

Extensive manufacturing facilities enable Hendrick to make prompt shipment of any style, from small buckets of light-gauge metal to larger sizes made from heavy plate.

Write for copies of sketches on which to submit your specifications.

SEE OUR CATALOG IN SWEET'S

HENDRICK
Manufacturing Company

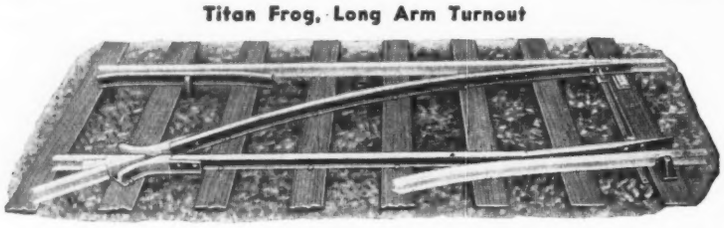
Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

41 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

KEEP More COAL ROLLING FASTER with DEPENDABLE FROGS and SWITCHES

WEIR KILBY

Titan Frog, Long Arm Turnout



The Titan Frog is furnished in Titanium or Manganese treated steel. In combination with the proper switches, stands, etc., it is easily installed; used right or left hand; saves joint bars.

Weir products for mine track work include a wide variety of constructions in frogs, switches, guard rails, clamps, stands, etc.



CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION
CINCINNATI 12, O. BIRMINGHAM 7, ALA.

feature simplification of inspection and blowing out on the larger ratings by access plates designed for speedy removal and replacement. Sealed bearings can be cleaned and refilled without motor disassembly. Double-end ventilation is provided by a blower on each end of the rotor. The synchronous motor also has a blower on the exciter. Starting characteristics of the squirrel cage type are NEMA Class B (normal torque, low-starting current) for across-the-line starting. Synchronous types are available in unity or leading power-factor, with torque and kva. requirements to suit the job.

•

Electrode

A new Page electrode developed to produce machinable welds on cast iron has been announced by Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa. The soft weld metal deposited by Page Ni-Cast shielded-arc electrodes bonds perfectly with all grades of cast iron, making it unexcelled for repairing broken or worn castings and casting defects, and for correcting errors made in machining, according to the manufacturer. After machining or grinding, the weld metal deposit closely matches the color of the cast-iron parent metal.

Differentials

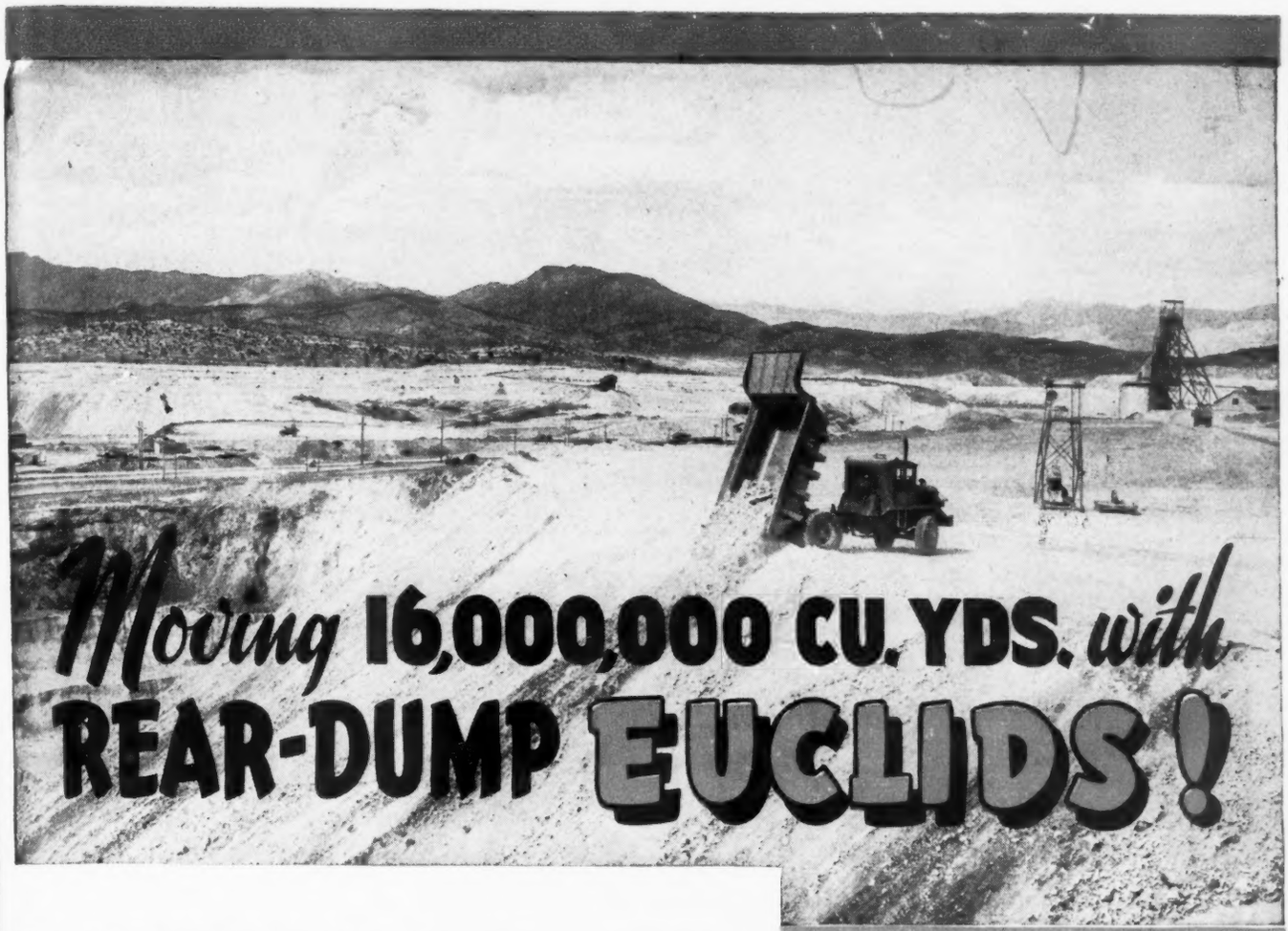
Detroit Automotive Products Corp., formerly the Thornton Tandem Co., is now producing 28 models of its NoSPIN differential in four basic sizes, series "C," "G," "J" and the new "E" for two-speed axles of the Eaton 1350 series.

When the NoSPIN differential replaces the conventional differential in truck axles, according to the manufacturer, it assures positive drive to both rear wheels yet provides differential action automatically when required, thus obtaining greater traction. Wheel spin is eliminated and if one wheel loses traction momentarily, the opposite wheel will still drive the vehicle until full traction on both wheels is regained. These differentials are designed for installation in various makes of trucks and are distributed by the Truckstell Co.

•

Hose Connections

A new master kit of Punch-Lok bands, which is said to serve practically every need for clamping or banding rubber hose to nipples and fittings and for a wide variety of general repair applications, is now available from The B. F. Goodrich Co., Akron, Ohio. Each kit contains a quantity of both open-end and preformed Punch-Lok bands for use in the many repairs that can be made with this handy clamping device and method.



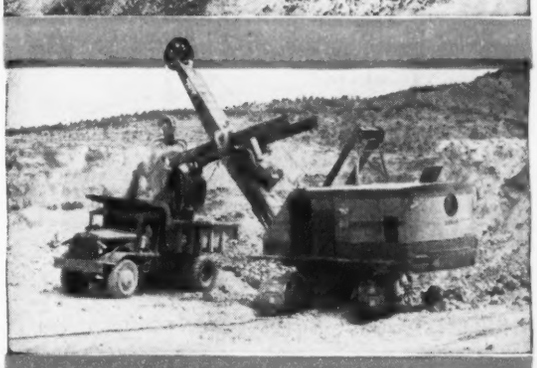
Moving 16,000,000 CU. YDS. *with* REAR-DUMP EUCLIDS!

The Isbell Construction Co. of Reno, Nevada is moving about 30,000 tons of overburden every working day of fifteen hours at this big open pit operation for one of the large copper producers in eastern Nevada.

Loaded by 2½ cu. yd. shovels, 23 Rear-Dump Euclids carry full 15-ton loads on hauls up to one mile in length. Working at an altitude of approximately 7,000 ft. the Euclids have plenty of power and speed for the long hauls and maximum adverse grades of 8%.

A leading contractor in the West, Isbell Construction purchased 10 Rear-Dumps of 15-ton capacity in 1943 and now has a total of 23 Euclids. Coming from men who know equipment and use it on the toughest jobs, these repeat orders are evidence of the efficient and reliable performance that is built into every Euclid.

Write for facts and figures on what Euclids can do for you on present or future work.





The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO





KEEP CONVEYOR OPERATION "IN THE BLACK"

QUAKER CONVEYOR BELTS

speed output . . . cut costs . . . resist abrasion

●

QUAKER PRODUCTS for the COAL INDUSTRY

BELTING
Transmission & Conveyor
PACKINGS
Sheet & Rod
HOSE
Air, Water, Steam

●

Cost-conscious mine operators want long-wearing, low-cost conveyor operation—and get it with Quaker Belts! Carefully built by experts, Quaker Belts are preferred by mines everywhere for their brute strength that resists severe shock, abrasion, constant wear.

Controlled vulcanization tightly bonds the many plies of resilient rubber and tough cotton duck into one rugged unit. Strong covering protects inner parts from wear. That's why Quaker Belts make heavy loads of jagged coal move along like a breeze.

When you want to move coal quickly . . . without letdown . . . at low cost—be sure it's a Quaker Conveyor Belt. Call your nearest Quaker Distributor for speedy, reliable service.

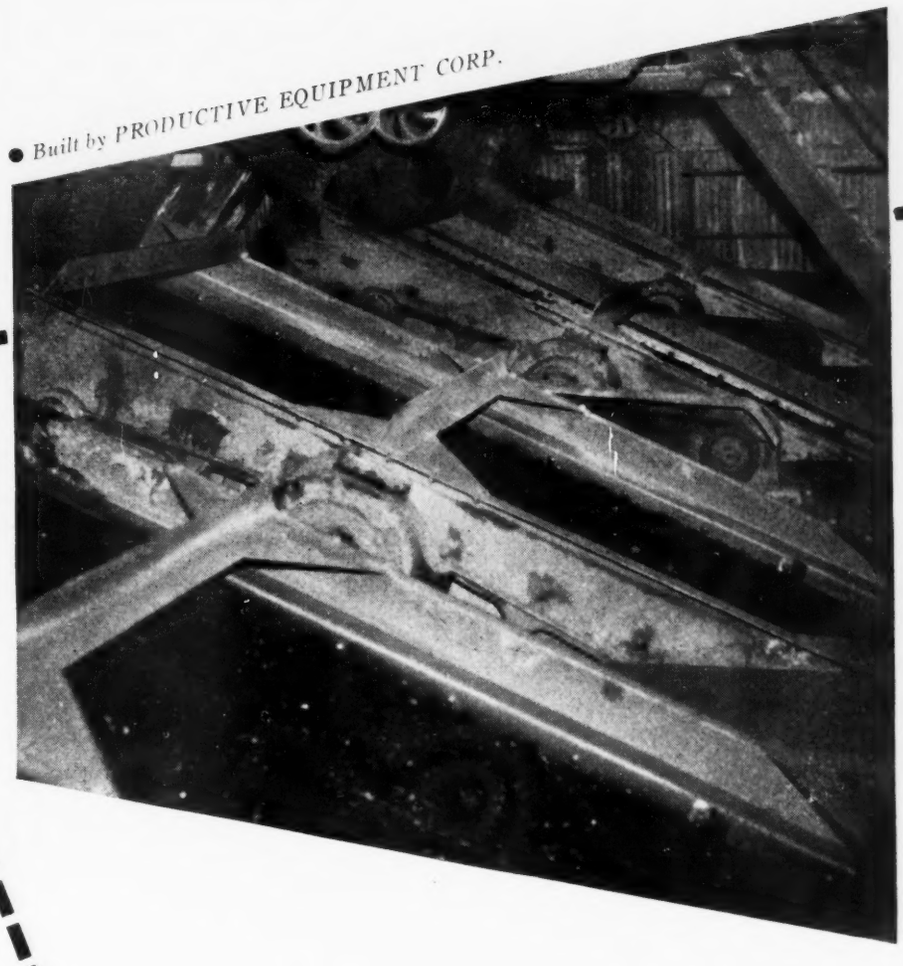
"If there's a way to get it done . . . Quaker will do it"

QUAKER RUBBER CORPORATION · PHILADELPHIA, PA. · QUALITY SINCE 1885 · REG. U. S. PAT. OFF.

QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • NEW YORK 7 • CLEVELAND 15 • CHICAGO 16 • HOUSTON 1

Western Territory
QUAKER PACIFIC RUBBER COMPANY • SAN FRANCISCO 5 • LOS ANGELES 21



● *Built by* PRODUCTIVE EQUIPMENT CORP.

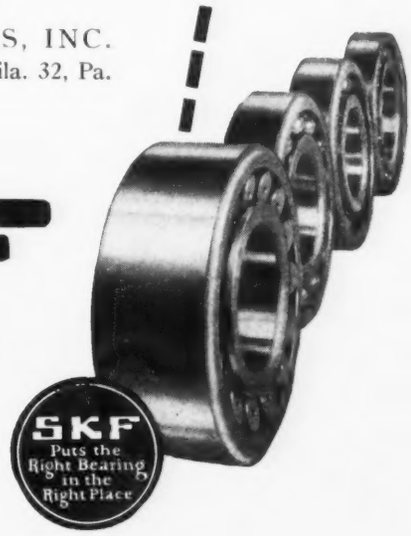
Engineered for profits in Coal Processing!

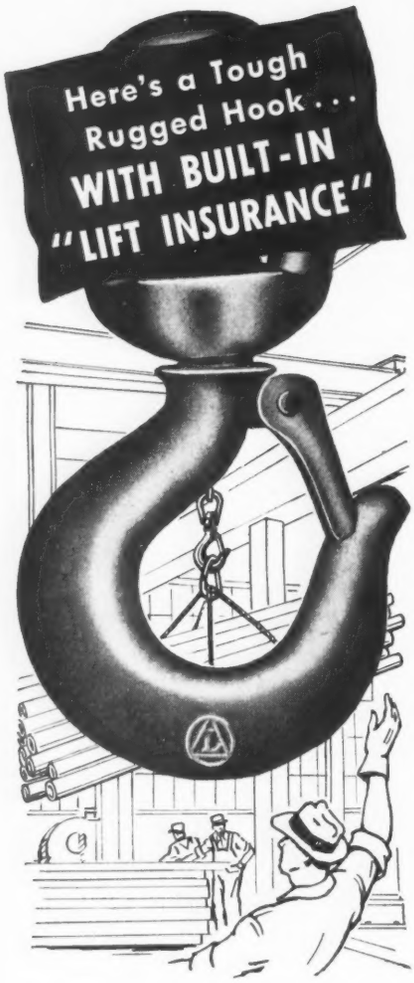
Selectro screens are successfully used for all sorts of coal cleaning, sizing, dedusting, dewatering and the production of stoker coal. And on each is a full-floating drive shaft mounted on SKF Spherical Roller Bearings. Carrying the entire load, these bearings provide an equalized load distribution insuring full bearing capacity and long life. Their *rolling alignment* eliminates binding and compensates for shaft deflections. The original self-aligning roller bearing, the SKF Spherical Roller Bearing is the right answer to *your* tough-job bearing problems.

6268

SKF INDUSTRIES, INC.
Front St. & Erie Ave., Phila. 32, Pa.

SKF
BALL AND ROLLER BEARINGS



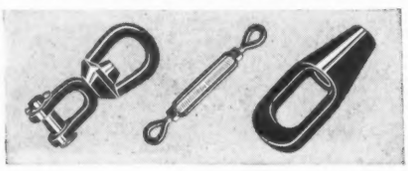


You pay no premium for this protection when your policy is to use Laughlin Safety Hooks on the job. With its sturdy latch to lock in the load, this drop-forged, heat-treated hook adds a big safety factor to every lift.

Laughlin's Safety Hook loads easily . . . latches automatically . . . *lifts safely*. It's one of the famous Laughlin Line of hooks which include grab hooks . . . hoist hooks . . . cargo hooks . . . hooks for every conceivable industrial application. They're distributed through mill, mine and oil field supply houses. Laughlin's 1947 catalog of industrial fittings will show you how you can save with safety. Write to The Thomas Laughlin Co., Dept. 6, Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS





Welders' Goggle

With the new Cesco Speed-Shift goggle, announced by the Chicago Eye Shield Co., 2300 Warren Blvd., Chicago 12, a quick flip of one hand moves the goggles in and out of position, it is said. The welder simply pulls the goggles slightly forward, then releases them on the forehead, the whole process requiring only a second. When inspection of work has been finished, the goggle is quickly returned to working position. There is no interference with personal glasses worn under the Speed-Shift goggle.

•

Unit Heater

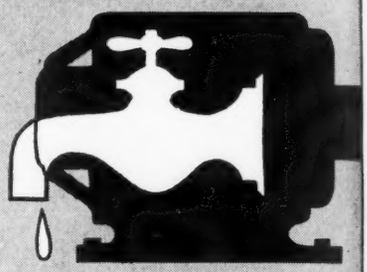
L. J. Wing Mfg. Co., 154 West 14th St., New York 11, has developed the Wing turbine revolving unit heater, in which the fan is driven by a compact all-steel steam turbine. The turbine exhaust, according to the manufacturer, passes into the heater section where it is used to heat the air which the turbine-driven fan then delivers through the Wing revolving discharge outlets to the working level below. Condensate, which is never above 170 deg. F., is returned to the boiler through an open-return system. No electric motor or electric power is required and there is no back pressure, packing or traps, it is said.

•

Valve Grinders

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, has announced a new Thor valve refacer and new Thor valve-seat grinder, complete with accessories, for all types of automotive valve and seat refinishing. The new Thor valve refacer features a dual electric-motor design, sturdy slide rods and solid, balanced construction — all specially engineered to provide high-precision valve refinishing, according to the manufacturer. Also new is the Thor "4 in 1" butt-end grinding attachment, which provides, as a unit, settings for four separate operations—grinding the rocker arm, tappet and valve stem and dressing the wheel.

PLUG THE LEAKS
IN YOUR MOTORS' PERFORMANCE



EQUIP THEM WITH

OHIO

★ specially designed
CARBON BRUSHES

It is an established fact that brushes must be engineered to the requirements of the motor. Altitude, underload and overload, atmospheric conditions; all these will retard efficiency of the motor or generator unless the proper application is used. Thousands of industrial concerns have availed themselves of our product and our recommendations. They have learned to depend on our 30 years of Research and Experience in the Laboratory, as well as in the field.

LET US SOLVE YOUR CARBON BRUSH PROBLEMS

BUY YOUR CARBON BRUSHES FROM A SINGLE SOURCE

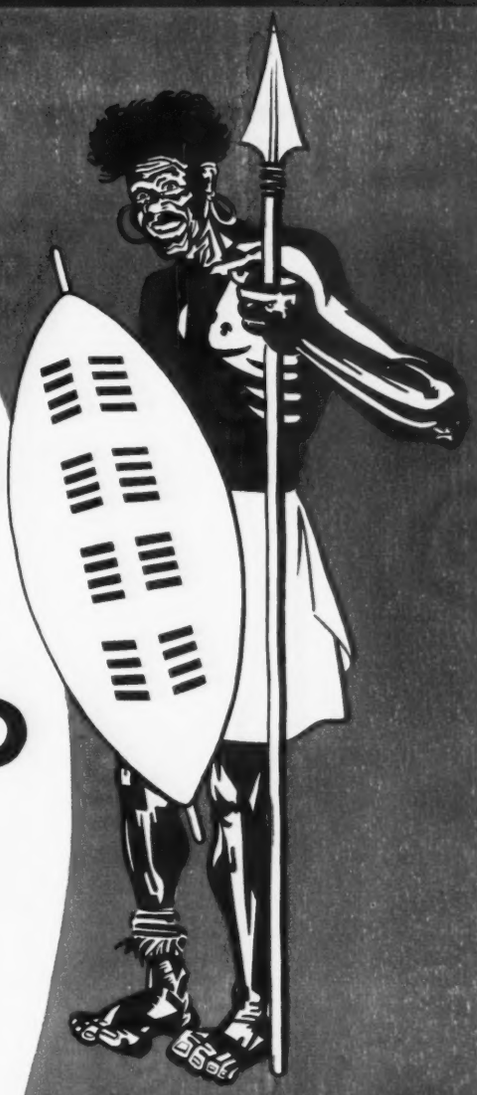
Call OHIO!

THE OHIO CARBON COMPANY
12508 BEREA RD., CLEVELAND 11, OHIO

PROTECTION WHERE NEEDED



lack Glove Blucher. Com-osition Cord and Leath-r Sole, Rubber Heel. **elivery-at-once.**



..Insure Workers Feet In Sure Protection

with HY-TEST *Safety Shoes*

Even the primitive warrior dressed for danger. Workers should do no less. It's easy for them to guard against toe injuries by wearing Hy-Test Safety Shoes. The Anchor-Flange Steel Box Toe wards off falling objects that could cripple for life. Sturdily constructed with all leather in vital parts, Hy-Test Safety Shoes give long-lasting protection and complete comfort in every step. They're available in sizes 5 to 15, in widths AA to EEE.

HY-TEST SAFETY SHOES

THE WORLD'S LARGEST SELLING SAFETY SHOE

HY-TEST *Safety Shoes*

ANCHOR FLANGE STEEL BOX TOE



This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting, tilting, and cutting through outsole under impact.

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MO. • EASTERN OFFICE • MANCHESTER, N. H.

RUGGED MOISTURE-RESISTANT



SLUSHER BLOCKS

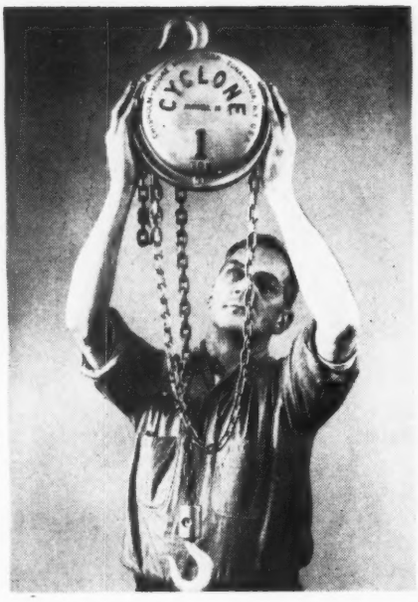
Check V

THESE FEATURES

- **TIMKEN ROLLER BEARINGS** for free running and long life under mining conditions.
- **MANGANESE STEEL SHEAVES** for maximum strength and minimum weight.
- **ANNEALED CAST STEEL SIDES**
- **ALLOY STEEL** heat-treated fittings which eliminate any chance of a "weakest link."
- **ANTI-FOULING CONSTRUCTION** with fully recessed sheaves.
- **SKOOKUM BROAD THROAT** construction to allow the passage of splices or fittings.

For the last word in engineered Slusher Blocks, Write for Our Catalog

SKOOKUM COMPANY, Inc.
8504 N. CRAWFORD ST.
PORTLAND 3, OREGON



Hoists

The new high-speed hand-operated Cyclone Model M hoists announced by the Chisholm-Moore Hoist Corp., Tonawanda, N. Y., through the ingenious use of steel and aluminum alloys, are nearly 45 percent lighter than standard hoists of comparable capacity, according to the manufacturer. Along with weight saving, strength and durability have been increased, it is said, and elimination of all excess bulk has resulted in a most compact hoist. A big reduction in the number of component parts is another feature, the company estimating that the hoist has 42 percent fewer parts than hoists of the same capacity. The hoist is said to be 96 percent mechanically efficient. The Cyclone Model M is available in four standard capacities: ¼-, ½-, 1- and 2-tons. All models are equipped with "Herc-Alloy" steel chain produced by the Columbus McKinnon Chain Corp.

•

Blower-Cleaner

A new Model No. 77 "3-in-1" blower and cleaner that blows, vacuums and sprays has been announced by Holub Industries, Sycamore, Ill. Powered by a 1-hp., sealed ball-bearing motor, the unit is controlled by a two-speed switch and is guaranteed for a year, according to the manufacturers.

•

Wire Stripper

A new "Hot Blade" wire stripper for continuous-production stripping has been announced by Ideal Industries, Inc., 1013 Park Ave., Sycamore, Ill. Through two electrically heated stripping blades, the unit will strip cotton, silk, synthetic (plastic) insulation or rubber covering from fine stranded or solid conductors and there is no possibility of cutting strands, nicking, scraping or injuring wire in any way, according to the company.

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS



Drop Forged Links

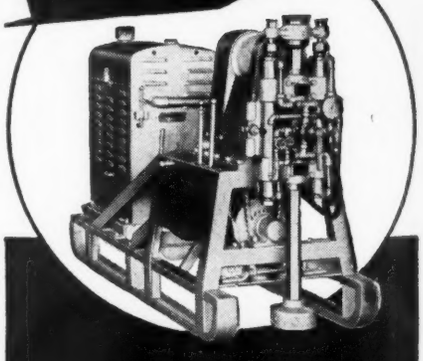
Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS



PITTSBURGH KNIFE & FORGE CO.
1421 Reedsdale St., N.S.
Pittsburgh 12, Pa.

Diamond Core Drilling CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

IT TAKES THIS *Little Bit*



TO KEEP THIS BIG BOY *Hustling!*



IT'S THE ONLY BIT THAT HAS CUTTING EDGES OF *AMAZINGLY HARD* KENNAMETAL

Kennametal is the "magic metal" that established such amazing records in speeding up production in the metal-working industries. Much harder than the hardest steel, it is tough and almost incredibly wear-resistant.

The Kennametal Bit is designed with cutting edges scientifically contoured for fast drilling to accurate size throughout the bit life, including many regrinds. An effective core breaker helps to keep the hole clear and prevent bit stalling.

BEFORE the shooting can be done—before the big shovels can begin their work—the blast holes must be drilled. A small investment in Kennametal drill bits keeps the big investment in equipment on the job as well as on the payroll.

Here's an Ohio mine foreman who says: "Drilling delayed our shovel operations before we used Kennametal Bits. Now, we're ready to blast right in back of the shovel!" And a Pennsylvania mine reports: "Kennametal Bit put down 15 holes, 60 feet deep, in 390 minutes, in overburden consisting of hard shale embedded with limestone nodules. Did not need resharpening."

Results with Kennametal Bits are equally outstanding wherever they are used. They drill holes true to gage—and drill more of them in less time. They drill an amazing amount of footage before sharpening is required—and they are good for many regrinds. They are saving up to 50% of drilling costs for other operators. They should be able to do it for you. Find out now—our mining engineer in your district will be glad to demonstrate. Write giving details of your operation.

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

Unit Responsibility

KEY TO MORE



More Westinghouse direct-current motors are used in coal mines than any other make. This Type SK dripproof motor drives a coal conveyer used for loading cars . . . typical of the many jobs they efficiently perform day in and day out.

FROM FACE TO SURFACE . . . PRACTICAL HELP ON ANY ELECTRICAL OR POWER PROBLEM

Today's demand means getting out every possible ton of coal . . . efficiently and economically. To accomplish this, every piece of equipment must operate at, or close to, the built-in capacity . . . thus insuring the maximum tonnage of coal per unit and per man delivered to the refining plant.

Electrification of mine equipment—the quickest means of getting "more coal per hour"—has been a responsibility of Westinghouse engineers for many years. Their background of knowledge and experience is the basis for equipment designed to give 100% performance *every* day . . . even under the most grueling operating conditions.

From face to surface, Westinghouse provides a single co-ordinated source for electrical equipment to operate every type of apparatus used in mining. It is this unit responsibility that assures the most efficient application of power for every job. Consult your nearest Westinghouse office or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. J-94742

E PRODUCTIVE POWER

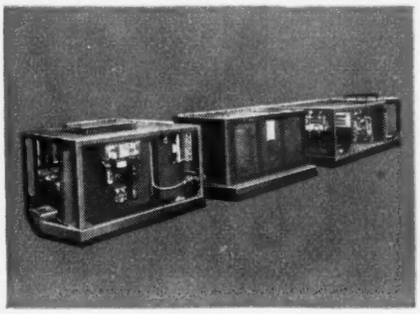
"WESTINGHOUSE-EQUIPPED THROUGHOUT" MEANS SIMPLIFIED ORDERING, QUICKER INSTALLATION, MORE EFFICIENT OPERATION

Putting power to work *productively* can be a major problem . . . or a simple one. When items must be selected, ordered and received from many sources, it means many chances for costly errors and delays . . . divided responsibility—or none at all—for performance of installed equipment.

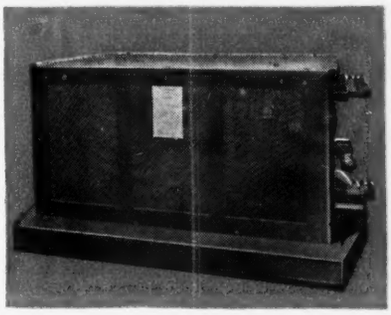
Westinghouse offers the way to simplify the job. From equipment for generation of electrical or steam power, to the most specialized types of drives, gearing and control for its utilization, Westinghouse provides a single source of supply . . . one broad pair of shoulders competent to take responsibility for performance of all parts of the job.

Here are a few of the places where Westinghouse unit responsibility prevents headaches . . . saves money . . . assures more productive power.

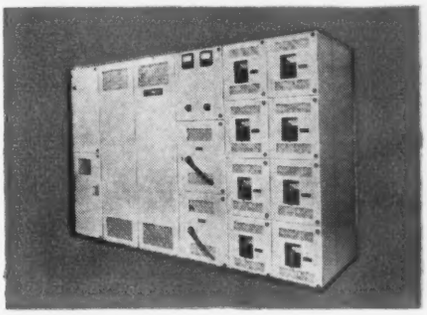
IGNITRON RECTIFIER—Lightweight, portable Ignitron equipment for efficient, dependable power conversion in mines. Pictured is a typical 3-truck Ignitron Substation complete with Dry-Type ASL Transformer, sealed Ignitron Rectifier, and automatic a-c and d-c switchgear.

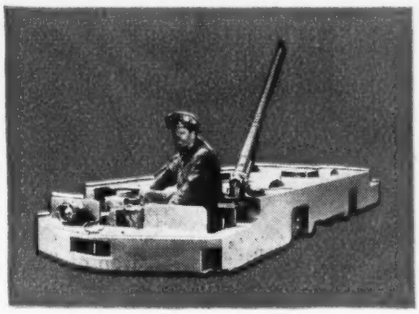


TRANSFORMERS—The complete Westinghouse line of power and distribution transformers includes oil or inerteen-immersed and air-cooled units—for mining service above and below ground. Shown is a 200-kva, ASL Mine-Type Transformer.

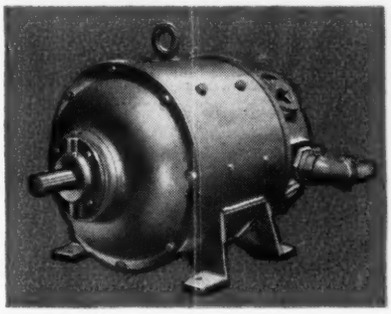


SWITCHGEAR—Westinghouse supplies a wide range of "Unitized" metal-enclosed switchgear that permits quick, economical installation. Photo shows a type ASL Power Center with high-voltage section at left and low-voltage at right.

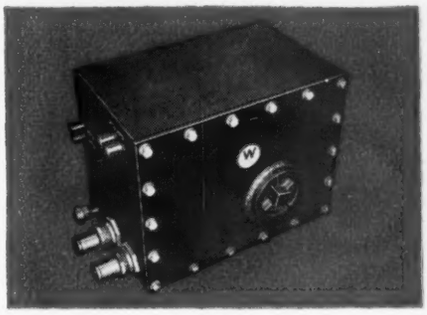




LOCOMOTIVES—Westinghouse builds most types of mine locomotives required for transportation of coal and supplies, underground and on the surface. Photo shows the *Low Liner*—only 26 inches high—for low seam operation.



MOTORS—Westinghouse motors represent the most advanced design and operating efficiency, with utmost resistance to moisture, corrosion and abrasion. Photo shows a d-c "explosion-proof" SK motor.



CONTROLS—Westinghouse controls cover the entire range of a-c and d-c applications to meet all mine operating conditions. Photo shows an explosion-proof enclosure for a-c or d-c starters.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MORE PRODUCTIVE POWER FOR INDUSTRY

WEDGE-BAR THE SCREEN

with

The Profile Bar

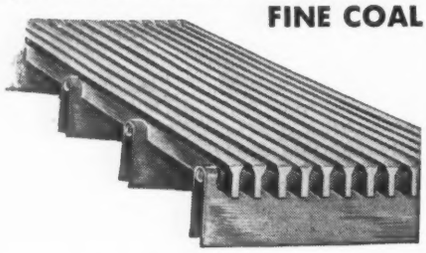
Continuous Slot Openings

Enlarging Downward

WILL

INCREASE PRODUCTION
LOWER MAINTENANCE

IN SIZING AND DEWATERING FINE COAL



WEDGE-BAR means continuous slots. No cross wires, loops or non-perforated areas. Downward enlarging slots draw moisture and undersize from screen surface. U-Holder supports mean maximum carrying capacity and rigidity.

WEDGE-BAR Sections are specially designed and fabricated to do your job and fit your equipment for the most efficient screen performance and longest life. Your inquiries are invited. Our engineering service can help you solve your screening problems.

Write us for our catalog.

Shaker Jackets • Vibrating Screens
Panels • Chutes • Conveyors • Dryers

WEDGE-BAR SCREEN CORP.

640 W. 134th St. New York 31, N. Y.

Plumb Bob

A quick-acting precise Micro plumb bob for use in construction and surveying, which has been engineer-designed and field-tested, has been announced by Suverkrop Instruments, Box 436, Bakersfield, Calif. The cord is reeled off a reel on the top of the bob to approximate length wanted, then slipped into hook that holds the bob exactly centered anywhere on cord. The bob can then be minutely adjusted up and down, simply by rotating the spool. When not in use, spool and hook hold cord neatly and securely in place, even with bob carried loose in tool box. The spool has a 30-ft. capacity and the bob is available in 10-, 12-, 14-, and 16-oz. sizes.

•

Tractor-Loader

A newly improved model Loadtrac hydraulic loader designed for attachment to the Ford-Ferguson tractor, makes for fast, powerful loading, digging and lifting, according to the manufacturer, Loadtrac Co., 8 South Michigan Ave., Chicago 3. Its design is said to permit the greatest hydraulic force to be exerted at the breaking-out position, at which point it will lift 2000 lb. and sustain, at a height of 8 ft., 1000 lb. It raises to this height in 5 sec. and lowers to the ground in 4 sec. The Loadtrac is mounted to the tractor in front by the installation of a special axle hinge pin to which the front of the loader is attached.

•

Industrial Notes

Goodyear Tire & Rubber Co., Akron, Ohio, has announced a full-color 16-mm sound movie, which tells a graphic story of conveyor belts at work in underground mines. Entitled "The Way Out," the film is said to be the first successful color movie made in an underground mine. Mining concerns and engineers interested in booking it should write the Goodyear sales promotion department.

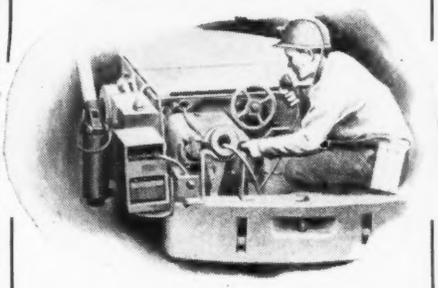
Macwhyte Co., Kenosha, Wis., has elected Robert P. Tyler, formerly general sales manager, vice president in charge of sales.

R. G. LeTourneau, Inc., Peoria, Ill., has appointed Robert P. Nichols assistant domestic sales manager. Joining LeTourneau after serving overseas as a maintenance officer in the Navy, Mr. Nichols became a field engineer in the installation department and more recently moved to the export division as sales supervisor.

Mack Trucks, Inc., New York, has appointed W. T. McCurdy district manager for the States of Tennessee and Arkansas, with offices in Memphis. A veteran of 22 years in the

TROLLEY PHONE

...talk between dispatcher and as many moving or stationary points as needed



The FEMCO Trolley Phone saves time, saves money, promotes safety. Small compact design of equipment permits installation anywhere. Designed and engineered for heavy duty. All plug-in units for ease of service.

Phone, write or wire for further details.

FARMERS ENGINEERING AND MFG. CO.
549 Brushton Ave. Pittsburgh 21, Pa.

PRESSURE CONCRETE

(GUNITE SYSTEM)
by HUDSON RUMSEY CO., INC.

For
Repairs & Construction of
- MINE TUNNELS
- BUILDINGS
- BRIDGES
- RESERVOIRS
- CANALS
- TANKS
- COAL BUNKERS
- WALLS
- DAMS

HUDSON RUMSEY CO. INC.
1200 NIAGARA ST. BUFFALO, N. Y.

P-G STEEL GRID *Resistors . . .*
for HEAVY DUTY APPLICATIONS:

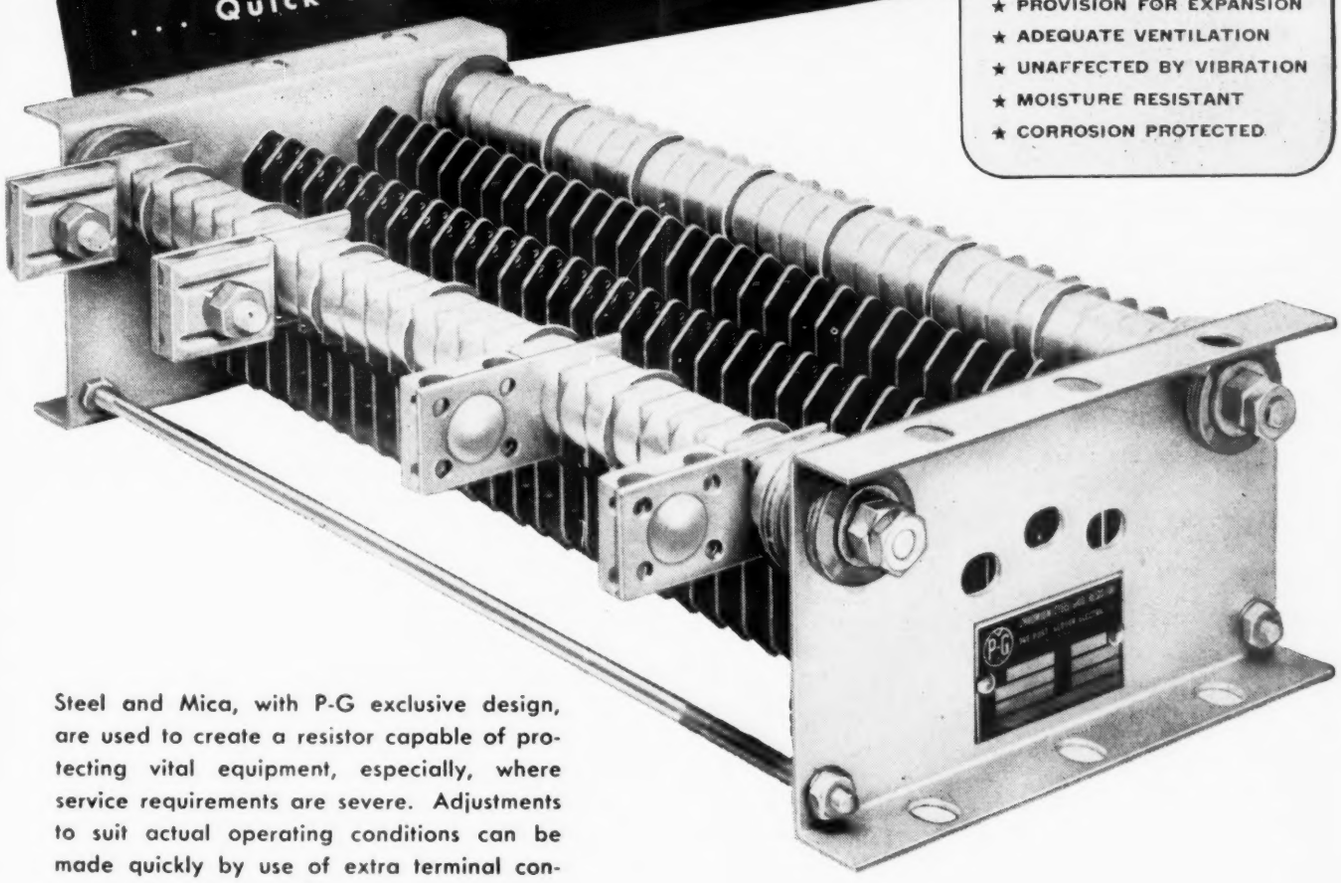
. . . Built for severe service conditions

. . . Protect vital electrical equipment

. . . Constant "Trouble Free" performance

. . . Quick adjustments easily made

★ ALL STEEL CONSTRUCTION
★ MICA INSULATION
★ RUGGED TERMINALS
★ PROVISION FOR EXPANSION
★ ADEQUATE VENTILATION
★ UNAFFECTED BY VIBRATION
★ MOISTURE RESISTANT
★ CORROSION PROTECTED



Steel and Mica, with P-G exclusive design, are used to create a resistor capable of protecting vital equipment, especially, where service requirements are severe. Adjustments to suit actual operating conditions can be made quickly by use of extra terminal connections usually available. Try P-G Resistors for constant "*Trouble Free*" performance.

Steel Grid Resistors* for COAL MINES *Since 1915

P-G

The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

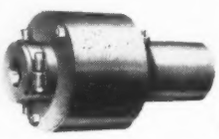
KINNEY *Clutches*

FOR POWER TAKE-OFF

Kinney Clutches pick up the heavy loads of winches, pumps and auxiliary equipment smoothly and positively — at high or low speeds — giving long, dependable service in the transmission of power on countless installations.

HIGH SPEEDS



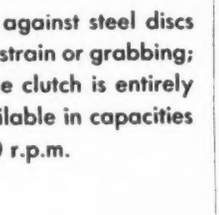


Dry Plate Disc Clutch

The Kinney Dry Plate Disc Clutch gives outstanding high speed service. All parts are carefully balanced and fully enclosed. The friction surfaces of sintered bronze run against steel discs and engage without strain or grabbing; when disengaged the clutch is entirely free from drag. Available in capacities 1 to 30 H.P. per 100 r.p.m.

LOW SPEEDS





Interchange Clutch

Rugged and simple, the Kinney Interchange Clutch is particularly suited for heavy loads and slow speeds. It transmits power directly through metal or asbestos flat discs and not through bolts or engaging mechanism. Furnished solid, or in split construction for easy installation. Available in capacities 2 to 40 H.P. per 100 r.p.m.

Write for Bulletin K-8

KINNEY MANUFACTURING CO.
3525 WASHINGTON ST., BOSTON 30, MASS.
New York • Chicago • Philadelphia
Los Angeles • San Francisco
We aso manufacture Vacuum Pumps, Liquid Pumps and Bituminous Distributors

Mack organization, Mr. McCurdy was formerly assistant manager of export sales.

Raybestos Manhattan, Inc., Passaic, N. J., has elected two vice presidents and a director, as follows: John H. Matthews, was elected vice president in charge of the Manhattan Rubber Division; O. H. Cilley, assistant general manager of the United States Asbestos Division, was made a vice president; and A. H. Heinsohn, general manager of General Asbestos and Rubber Division, was named to the board of directors.

Caterpillar Tractor Co., Peoria, Ill., has appointed W. N. Foster, formerly divisional district representative, assistant eastern division sales manager, succeeding C. A. Barabe, who will start a six-month medical leave of absence June 15.

Electric Machinery Mfg. Co., Minneapolis, has named R. H. Kutscher manager for the Pittsburgh sales territory, succeeding H. L. Renking, who becomes district manager of the southwestern territory, with headquarters at Dallas, Texas. Mr. Kutscher for the last eight years has been manager of the company's service department.

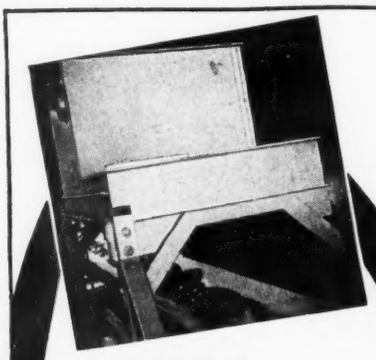
Falk Corp., Milwaukee, has appointed Dave S. Ferree district manager of its new Philadelphia sales office. His territory includes the Pennsylvania and Delaware areas formerly handled by Martell & Ferree and the York, Pa., area, managed by the late John Ericson.

Euclid Road Machinery Co., Cleveland, has established a sales development department, headed by W. L. Snow, for field engineering studies for the improvement of current Euclid models and the development of new products. Mr. Snow joined Euclid's engineering department in 1935 and served as assistant chief engineer until 1942, when he became manager of industrial products.

Henry Disston & Sons, Inc., Philadelphia, has elected S. Horace Disston chairman of the board of directors. Mr. Disston has 48 years of service with the company, the past eight of which as president. Jacob S. Disston Jr., a vice president of the company for 14 years, was named president of the company.

American Car & Foundry Co., New York, has named Justus W. Lehr district manager in charge of the ACF Berwick, Pa., plant, succeeding Guy C. Beishline, recently resigned. Joining ACF in 1940, Mr. Lehr served as assistant district manager of the ACF Berwick plant until his transfer as head of the ACF Chicago plant in December 1944.

Federal Electric Products Co., Newark,, N. J., has appointed William M. Stark manager of the company's Southwestern district, with headquar-



MERRICK WEIGHTOMETER

While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER keeps a continuous and accurate record of weights. Total weight is available at a glance.

Applied to any size belt conveyor, either horizontal or inclined. The weightometer gives a simplified and dependable record of your production, without interrupting the flow of coal.

Write for Bulletin 375

MERRICK SCALE MFG. CO.
PASSAIC, N. J.

SIGN OF QUALITY

MARLO

PACKING *for* MINE PUMPS

Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• **MARLO ALL PURPOSE METALLIC PACKING**
Best ever devised. Will not freeze at 70° below, soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• **"TWIN-TWIST" SEMI-METALLIC PACKING**
Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressibility. Never hardens. For temperature up to 550° F.

• **"RED WATER" SEMI-METALLIC PACKING**
Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

THE MARLO COMPANY
38 HOWARD ST.
NEW YORK, N. Y., U. S. A.



Try this for size . . . and boost payloads and savings

Here's a big idea that converts your medium-duty coal trucks to heavy-duty, six-wheel haulers.

It's the Thornton 4-rear-wheel Drive!

It boosts trucks of 15,000 to 16,000 lbs. G.V.W. to 26,000 to 32,000 as a truck . . . 42,000 to 44,000 as a tractor. Not only that—but it also enables your trucks to carry heavier loads in strip mining work as well as general coal-hauling.



This popular conversion unit includes a two-speed gear case assembly with a NoSPIN Differential—the automatic-locking differential that assures positive drive at all times. A NoSPIN Differential can also be installed in each driving axle to prevent wheel-spin.

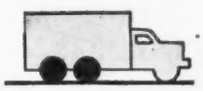
The Thornton 4-rear-wheel Drive also includes an extra driving axle, to give you two instead of one. And you get two extra wheels, four extra tires, "walking-beam" springs, frame reinforcements and attaching parts. Because the load is spread over eight tires instead of four, far better flotation is assured.

Find out how this BIG idea can double your payloads. Call your truck dealer or local Truckstell distributor. Or send coupon below. The Truckstell Company, Union Commerce Bldg., Cleveland 14, Ohio.

THORNTON 4-REAR-WHEEL DRIVE

Converts a Medium-duty Truck





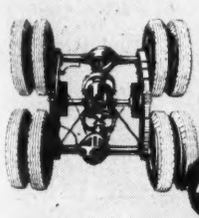
. . . into a Big, Powerful Six-Wheeler

RESULT: 100% More Payload

100% More Tractive Effort

THE NoSPIN DIFFERENTIAL used in the Thornton 4-rear-wheel Drive will also increase the efficiency of *4-wheel* trucks. Fits virtually any driving axle. Prevents wheel-spin . . . keeps trucks from stalling in mud, muck, sand, snow . . . on ice or slippery roads.

FREE! Send for your free copy of new illustrated folder. Tells how the Thornton 4-rear-wheel Drive will help you solve your problems.



THORNTON 4-REAR-WHEEL DRIVE

Approved and Distributed by TRUCKSTELL
SPECIALIZED EQUIPMENT FOR PLUS PERFORMANCE

Mfd. by DETROIT AUTOMOTIVE PRODUCTS CORP.
(Formerly Thornton Tandem Company) DETROIT, MICH.

The Truckstell Company, Dept. CA-6
1274 Union Commerce Bldg., Cleveland 14, Ohio

Yes . . . I want to know *more* about the Thornton 4-rear-wheel Drive, and how it will enable my.....(make) trucks to earn more money. Please send free folder and name of nearest Truckstell distributor.

Name.....

Address.....

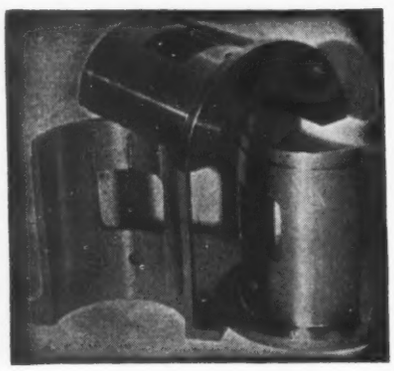
City.....Zone.....State.....

A SPECIFIC FORMULA FOR EACH APPLICATION MAKES FOR LONGER LIFE

PROMET
THE Engineered BRONZE

AXLE BEARINGS
JOURNAL LINERS
BUSHINGS and
WEARING PARTS

For
GENERAL ELECTRIC • GOODMAN
WESTINGHOUSE • SULLIVAN
OLDROYD • JOY • JEFFREY
EQUIPMENT



PROMET CASTINGS

Any size, shape or section, up to 3,000 lbs. Pattern making, designing, machining.

★

BAR STOCK

Round, hexagon, square. Rough cast, semi-finished. Cored stock all sizes (by ⅛" steps) from ½" minimum core to 12" O.D. and 12" lengths. 6 grades of hardness.

★

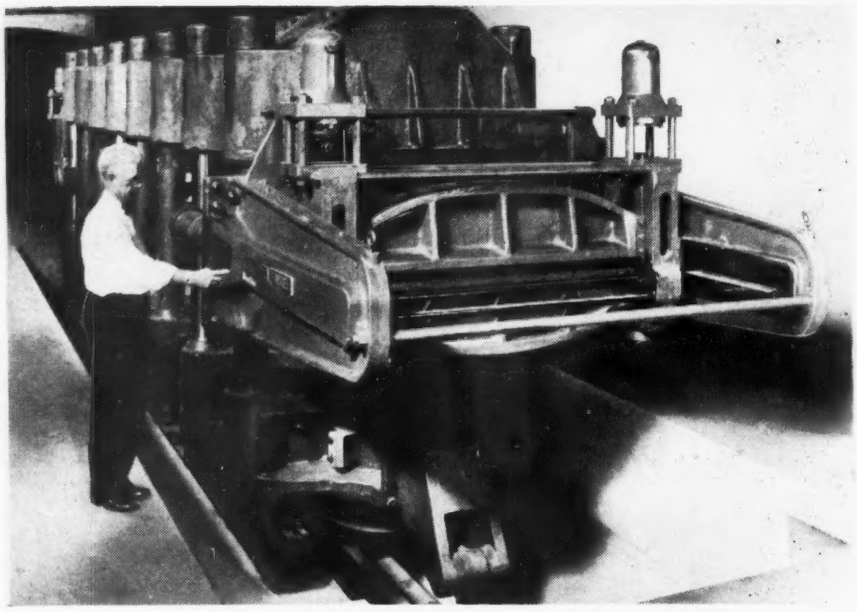
PROMET MINE SPECIAL BABBITT

Lead base, all virgin metals, perfectly alloyed. Fine, velvety grain. Entire bearing surface wears uniformly, without pitting. Unaffected by moisture. Simply heat to 900°-950° and pour. Can be repeatedly remelted and reworked. Repouring only refines it. No appreciable shrinkage, hence better contact with supporting shell, a more solid, rigid bearing. In 10-lb. pigs.

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MT. LEBANON, PA., L. E. Nasser, 720 Roselawn Ave. . . . . Phone LE-9876
WHEELING, W. VA., Pollish & Company, 116-111 Fidelity Building . Phone 1795
WILLIAMSON, W. VA., Williamson Supply Co. . . . . Phone 1200



Cincinnati Rubber Installs Large-Size Belting Vulcanizer

J. F. Joseph, president, Cincinnati Rubber Mfg. Co., stands before a large hydraulic press for vulcanizing conveyor belting recently installed at the company's plant. The press, which exerts a total pressure of 3,040 tons by a hydraulic pressure of 2,000 lb. per square inch transmitted through eight 22-in.-diameter rams, produces belts as large as 54 in. wide.

ters in St. Louis. George L. Stout is the new manager of the East Central district, with offices in Cincinnati; and Clarence G. Landeck becomes manager of the Middle Western District, with headquarters in Chicago.

Truckstell Co., Cleveland, Ohio, has appointed W. F. (Wally) Balzerick merchandising manager. During the last two years he has served as Western divisional manager.

Northwest Engineering Co., has moved its executive and sales offices to new and larger quarters in the Field Bldg., 135 South LaSalle St., Chicago 3.

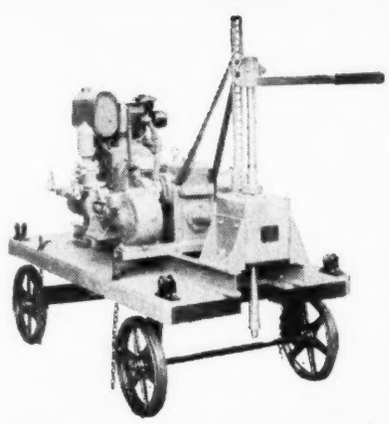
Dresser Industries, Inc., Cleveland, has elected as vice president, Rudolph E. Reimer, secretary and treasurer of the company.

Gardner-Denver Co., Quincy, Ill., has named A. H. Jones, for many years manager of the company's branch office in Los Angeles, director of its export office in New York City. Mr. Jones also was elected vice president of the newly formed Gardner-Denver Western Hemisphere Co.

General American Transportation Corp., Chicago, has acquired The L. R. Christie Co., New York City, builders of industrial dryers for more than forty years. The Christie line is expected to complement General American's line of drying, dewatering and cooling machinery. Walter N. Fowler, vice president in charge of export, has been elected to the company's board of directors.

Raynham Rivet & Fastener Co., Raynham, Mass., has acquired the former Nelson Rivet Co. plant and equipment and will specialize in the manufacture of small rivets, particularly Tinner's Tinned Rivets. The new organization has appointed Surpless, Dunn & Co., New York and

CORE DRILLS



- Accurate cores of coal seams by using single or double tube core barrels.
- Ideal for determining overburden before strip mining.
- Diamond—alloy or steel shot bits.
- Light weight — easy to move in rough country.

SEND FOR BULLETINS

ACKER DRILL CO.
SCRANTON 3, PA.



a thousand and one...

MACWHYTE WIRE ROPES

... all job-proved ... assure you the correct rope for your equipment

When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte consulting engineers will check your equipment and recommend the wire rope specifically engineered for your job. Ask your Macwhyte distributor, or write Macwhyte Company.

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NO. 915

Make MACWHYTE your headquarters for WIRE ROPE and SLINGS

MACWHYTE PREFORMED AND NON-PREFORMED INTERNALLY LUBRICATED WIRE ROPES... MONARCH WHYTE STRAND Wire Rope ... Special Tractjon Elevator Rope... Stainless Steel Wire Rope ... Monel Metal Wire Rope ... Galvanized Wire Rope. Macwhyte also makes Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies, Tie-Rods. Catalogs on request.

Chicago, as national sales representatives.

Cummins Engine Co., Columbus, Ind., has elected C. L. Cummins, founder of the company, chairman of the board of directors, and J. I. Miller president. Mr. Miller joined the company in 1934 as vice president and general manager.

Jenkins Bros. has elected as vice president C. C. Chamberlain, general sales manager. Mr. Chamberlain, who joined the company in 1929, also was recently elected to the board of directors.

•

Trade Literature

Available Without Charge on Request to the Manufacturer

Crawler-Track Lubrication — Texas Co., 135 East 42 St., New York 17. A 12-pg. reprint from the company's publication, *Lubrication*, entitled "Crawler-Track Lubrication and Maintenance," discusses in detail the several parts of various types and makes of crawler tracks and is illustrated with numerous photographs and cross-section drawings.

Tractors — Caterpillar Tractor Co., Peoria 8, Ill. Individual folders describe the power and work features of the new more powerful Caterpillar diesel D6 and D4 tractors and include specifications, application illustrations, etc.

Protective Coating — Wailes Dove-Hermiston Corp., Westfield, N. J. Pamphlet on Koppers Bituplastic, a new plastic protective coating that waterproofs and vapor seals, lists its special adaptability to various uses and its ability to waterproof and damp-proof any wall surface of metal, masonry or concrete, with details on its quick drying, fire retardancy and ability to withstand extreme temperatures.

State Truck and Trailer Road Laws —Four Wheel Drive Auto Co., Clintonville, Wis. 18th edition of booklet listing state truck and trailer size and weight restrictions is the first issued since the war when individual state laws were superseded by federal regulations.

Ear Stoppers—Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8. Bulletin No. HA-3 describes M. S. A. Ear Defenders, said to provide a simple, inexpensive means of excluding excessive noise while permitting speech and warning signals to be heard.

Mining Equipment Parts — Jeffrey Mfg. Co., Columbus 16, Ohio. Booklet No. 799 illustrates and describes Jeffrey renewal parts and accessories for mine locomotives, cutting and loading machines and other underground equipment.

Welding — Lincoln Electric Co., Cleveland, Ohio. Application Sheet No. 98 (a continuation of Sheet No. 97) discusses "The Proper Approach in the Design of Welded Steel."

Brake Blocks, Linings, Clutches — Johns-Manville, 22 East 40 St., New York 16. Bulletin No. FM-12A lists and describes the company's line of industrial friction materials. A special selection chart facilitates choice of the proper item for various applications.

Portable Drinking Fountain—Dobbins Mfg. Co., Elkhart, Ind. Folder illustrates the 4-gal. Dobbins portable drinking fountain for use wherever a permanent water supply is not available.

Magnetic Clutches — Stearns Magnetic Mfg. Co., Milwaukee 4. Catalog No. 226 on magnetic clutches and clutch-brake units covers magnetic-clutch applications and contains specifications, illustrations, torque formulae and other information on magnetic-friction-device control.

Centrifugal Pumps—Warren Steam Pump Co., Inc., Warren, Mass. Bulletin No. 225 describes Warren single-stage, double-suction Type DB and DBM centrifugal pumps, available in 1½-, 2-, 3-, 4-, and 5-in. discharge sizes; capacity: 30 to 1200 g.p.m., 20 to 170 total head.

Speed Selector—B. F. Goodrich Co., Akron, Ohio. Folder describes the new improved Variable-V-Planetary infinite ratio speed selector recently announced jointly by Speed Selector, Inc., Cleveland, Ohio and The B. F. Goodrich Co. The bulletin includes construction, dimensions, horsepower and torque ratings.

Diesel Engines—International Harvester Co., 180 North Michigan Ave., Chicago 1. Individual folders provide complete specifications for the UD-14A and UD-18A diesel engines and power units. Bearing areas, moments of inertia, material specifications, performance charts and dimensions are among the data listed.

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Authoritative Valuations, and Reports of Mining Properties Equipment and Operation.
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Continuous Consulting Service to Coal Mines
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Flame cutting and arc welding *simplify Maintenance*

Laborious, time consuming colliery maintenance jobs can now be performed quickly and at low cost with the oxyacetylene flame and electric arc.

Typical examples include: reclamation and repair of worn motor cases by welding resulted in a saving of several thousand dollars for one colliery. In another, a skeleton-type frame for a six-ton locomotive, which had been fractured in four places, was repaired by arc welding.

For repair work on mine-car bodies old bolts are easily removed with a cutting torch. Damaged car sections can be cut away, new sections fabricated on flame cutting machines and arc welded into place. Bent members can be straightened by flame heating.

These are just a few of the many profitable Airco oxyacetylene flame and electric arc applications in and around mines. Others include welding of rail ends to form one continuous rail . . flame hardening of machine parts . . . rebuilding of worn surfaces . . . hard facing of equipment subjected to wear . . . and numerous other repair jobs.

For further information about these cost-cutting, time-saving processes write for the explanatory article — "Welding, Flame Cutting for Efficient Maintenance and Low Cost." Address: Dept. CA-6122, Air Reduction, 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

HEADQUARTERS FOR OXYGEN, ACETYLENE AND OTHER GASES...CARBIDE...GAS WELDING AND CUTTING APPARATUS AND SUPPLIES...ARC WELDERS, ELECTRODES AND ACCESSORIES

The Parachute Lets YOU Down Easy!

FAMOUS U. S. ISSUED PATENTS

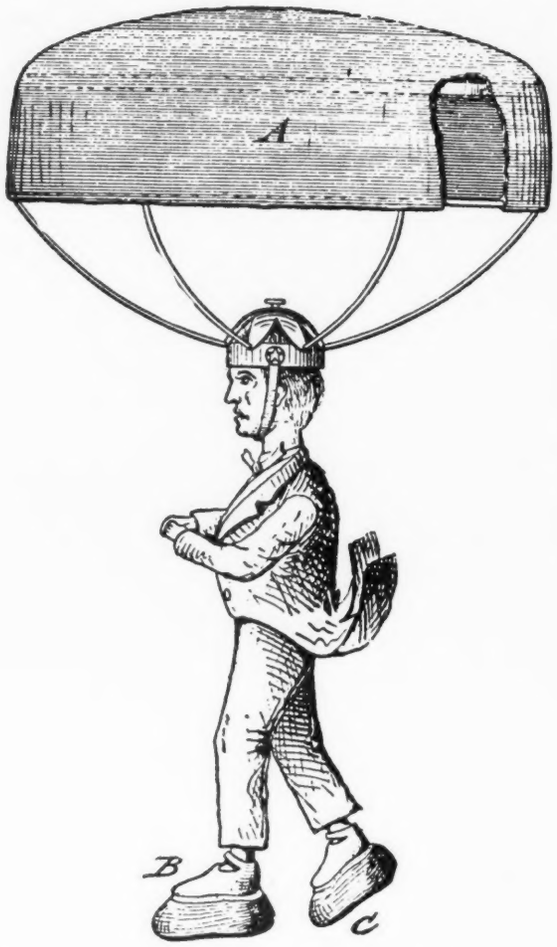
NO. 6 OF A SERIES

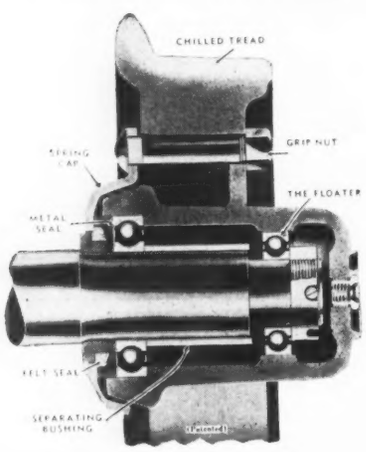
FIRE ESCAPE

No. 221,885 **Patented Nov. 18, 1879**

"This invention relates to an improved fire-escape or safety device, by which a person may safely jump out of the window of a burning building from any height, and land, without injury and without the least damage, on the ground; and it consists of a parachute attached, in suitable manner, to the upper part of the body, in combination with overshoes having elastic bottom pads of suitable thickness to take up the concussion with the ground . . ."

(Language inside quote marks taken directly from U. S. Patent.)





SAVE MONEY WITH S-D "FLOATER" WHEELS

You grease "Floaters" about once in 5 years. With "Floaters" you can increase your load hauled by locomotive 50 percent. Increase over-all efficiency tremendously. "Floater" wheels are guaranteed against breakage or bearing failures for 5 years. We make it easy for you.

We Let Your COAL Down Easy—

If a greater percentage of lump coal is worth money to you, then you need S-D 1-2-3 "AUTOMATICS" badly. They handle the lumps in the easiest possible way, setting each lump down gently.

Here Is How They Work

All bottom doors are released for dropping before the cars reach the bin. Then, as the cars pass over the bin, the forward door will slide over the coal already in the bin and will start discharging coal as soon as it reaches a place where it can descend. In this way, the lumps supported by this door are discharged gently on the sloping face of the coal already in the bin and receive no shock or jar in the process. The second and third doors follow the same routine. In this way the storage bin may be leveled full from one end to the other without the lumps having fallen any distance so as to be broken by impact. No other automatic mine car can handle coal as easily.



Sanford-Day Iron Works, Knoxville 9, Tennessee



Another Recently Developed Fine Feature of S-D "AUTOMATICS"

We have now eliminated the latch lever bar that we formerly used across the rear end of the car. This latch lever projected past the side walls of the car, with the result that when the cars were derailed or met obstructions in the mine, the latch lever bars were often bent and had to be straightened before the doors could be unlatched. Furthermore, in our old design we used only one latch hook.

In our improved and patented method of releasing the doors for dropping, we have two latch hooks and the doors are unlatched automatically from underneath the car by tripping devices that engage the latch hooks directly and push them back as the car moves forward. Therefore, the rear end of the mine car today looks like the front end; namely, there is no latch lever mechanism upon it.

The coal company that first used the S-D "AUTOMATICS" has installed the new type of unlatching, and the president of the company told us it was one of the greatest improvements made in bottom-dumping mine cars since the original patents were issued.

"AUTOMATICS" Are Made Any Capacity Whatsoever

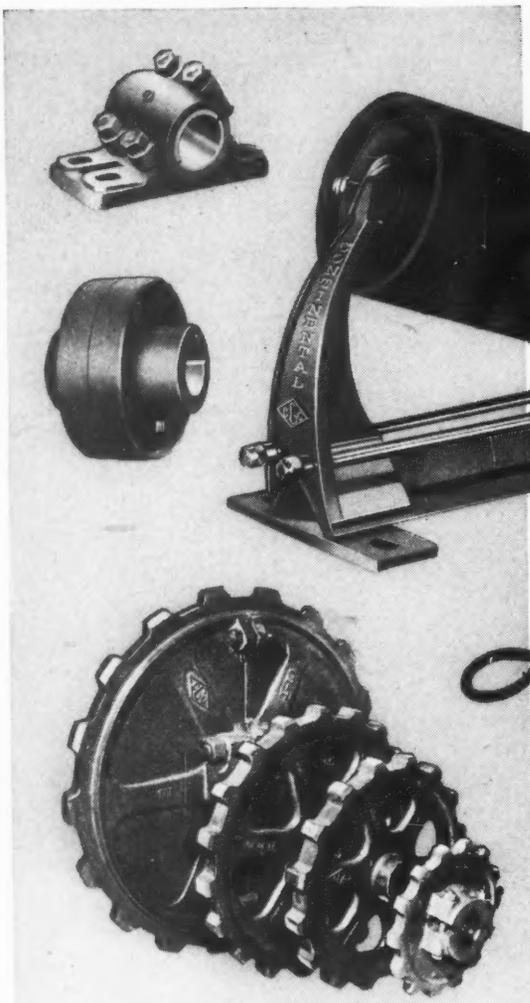
S-D "AUTOMATICS" have been made already to carry more than 40 tons. We are making an 8-wheel S-D "AUTOMATIC" car to go inside mines, or for strip mining either, which is 37 ft. over-all and 4 ft. 8 ins. high, and which will hold approximately 27 tons of coal. The general principles of operation are the same whether the car holds one ton or 40 tons. None of the cars are racked or twisted by being turned over endwise, or by being tilted on end. Some of the largest cars are now being equipped with Westinghouse air-brakes.

Leasing of "AUTOMATICS" Is Getting More and More Popular

Today we have more orders for cars on our books that are to be leased to the customer than we have ever had in our history. This method of equipping the mine with "AUTOMATICS" has been found to be very desirable from the standpoint of the user. Throughout an average period of 15 years, the cost of leasing the cars has averaged less than 2c a ton for the quantity of coal handled in the car. Moreover, you can, if you wish, end the lease contract by purchasing the cars at a reduced price. Let us go over the terms of our lease with you and explain it to you so you will clearly understand its advantages. When you lease cars from us, you make no cash investment in the cars themselves, and very little for the bin equipment. Bins are necessary if the cars are to be used to the best advantage. If you want one of our representatives to call on you, drop us a line. If your mine is where our representatives do not travel, write us a letter, or send us a telegram, or call us up over the long distance telephone.



Sanford-Day Iron Works, Knoxville 9, Tennessee



CGC

Look to CONTINENTAL for leadership!

Continental manufactures a complete line of standard equipment to meet your need for materials handling and power transmission.

pulleys · sheaves
take-ups
belt conveyor idlers
pillow blocks · bearings
trippers · sprockets
speed reducers · hold-backs
collars · couplings
screw and bucket elevators
helicoid and sectional screw conveyors
v-belt drives · hangers · chain drives

...Look to CONTINENTAL for leadership

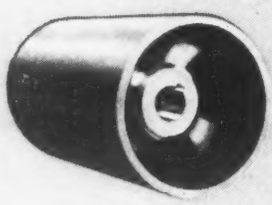
Engineers and Manufacturers

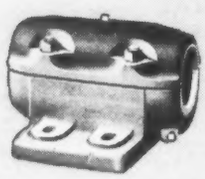
Industrial Division

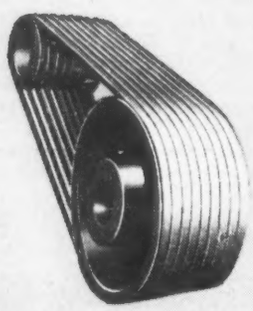
CONTINENTAL GIN COMPANY

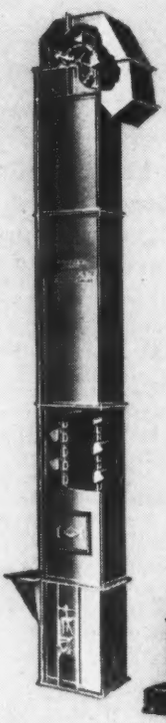
BIRMINGHAM, ALABAMA

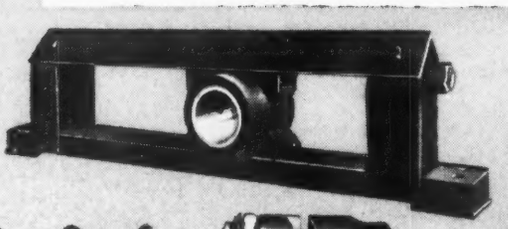
Sales Offices also in Atlanta, Dallas and Memphis
Plants in Birmingham, Ala., Prattville, Ala., Dallas, Texas

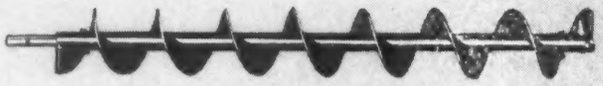


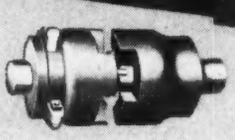


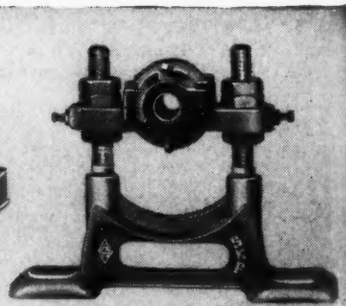






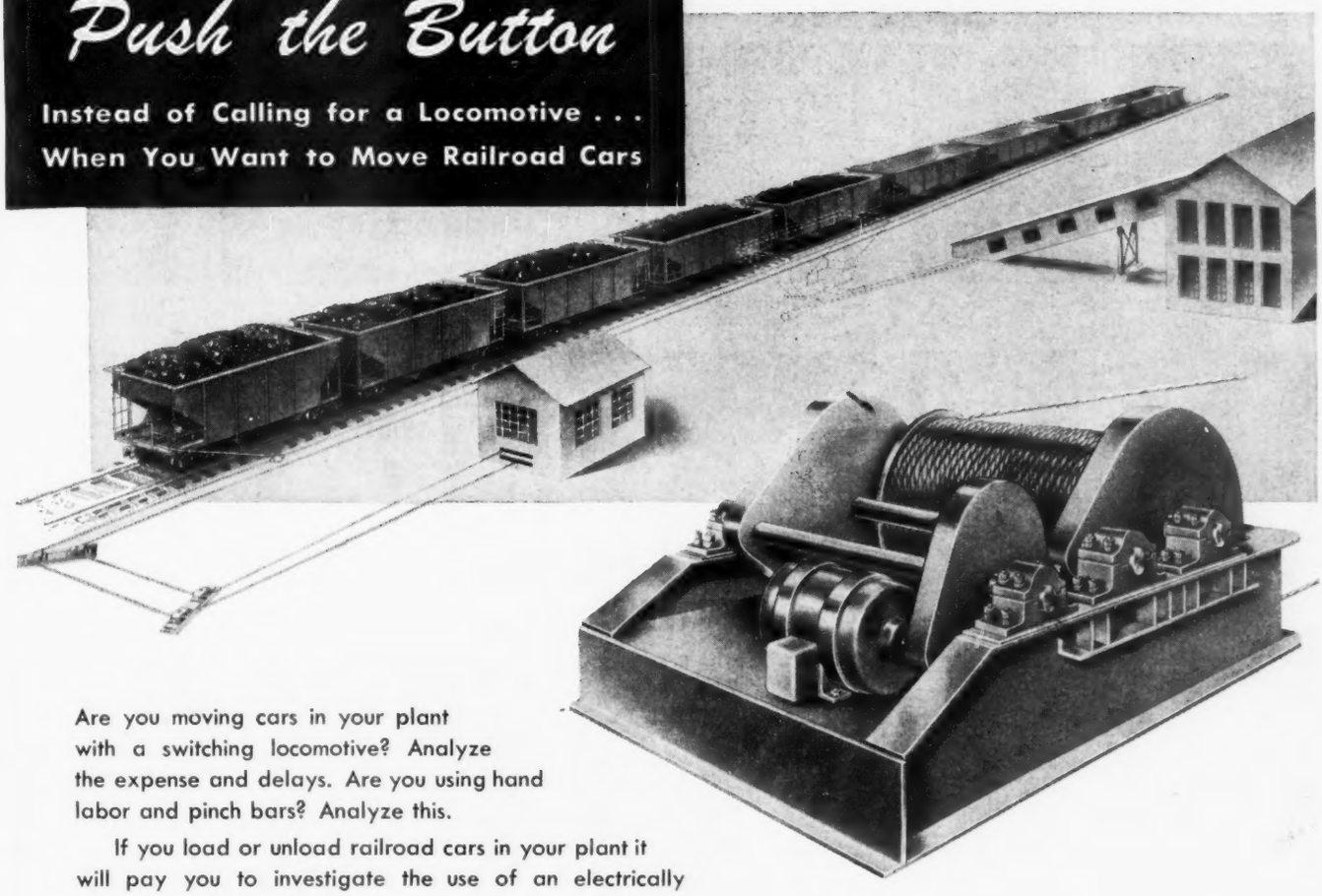






Push the Button

Instead of Calling for a Locomotive . . .
When You Want to Move Railroad Cars



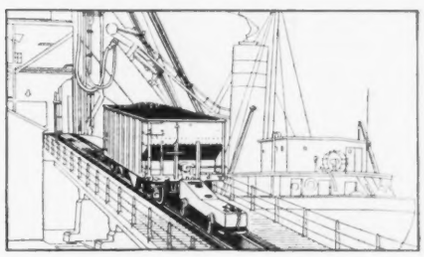
Are you moving cars in your plant with a switching locomotive? Analyze the expense and delays. Are you using hand labor and pinch bars? Analyze this.

If you load or unload railroad cars in your plant it will pay you to investigate the use of an electrically operated H&P Car Haul.

An H&P Car Haul or Car Puller will do the job whether you must move a single car a few feet or a whole train of cars hundreds of feet. They will move your cars quickly and efficiently. Your investment will be recovered in a short period.

We build every type of car moving device from a simple Car Puller to the largest "MULE" Car Haul for fast movement of loaded cars up the slope to a giant car dumper. Included are: *CAR PULLERS* . . . for simple movement; *RING CAR HAULS* . . . for moving whole strings of cars on one or two tracks in either direction to a loading or unloading station; *ENDLESS CONTINUOUS RUNNING CAR HAULS* . . . for moving cars in either direction at any point on a dock or high line; *"MULE" CAR HAULS* . . . with 1000 HP drive to move and elevate loaded cars to be dumped. We also build all kinds of Barge Moving Equipment.

Send your Car and Barge Moving Problems to H&P. Let us make a recommendation.



This Thousand-Horse Power "MULE" elevates a loaded Coal Car 30 feet every minute.

Ore Bridges
Railroad Car Dumpers
High Lift-Turnover-Rotary
Boat Loaders & Unloaders
Car Hauls & Boat Movers
Bradford Breakers
Coal & Coke Handling Equipment
Pig Iron Casting Machines
Coal Preparation Plants
Rotary Mine Car Dumpers
Coal Crushers
Refuse Disposal Cars
Coal Storage Bridges

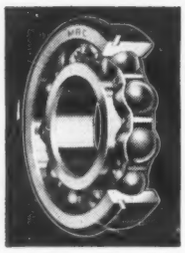
Heyl & Patterson, Inc.

"SINCE 1887"

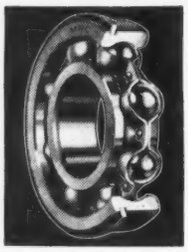
55 WATER STREET · PITTSBURGH 22, PA.

M-R-C BALL BEARINGS

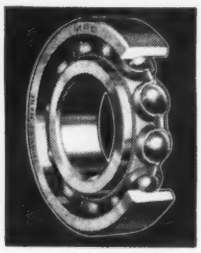
Complete Range of Types for Mining Machinery Requirements



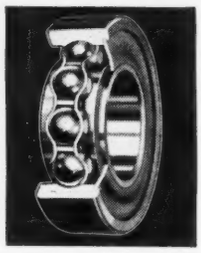
Maximum-Capacity
Snap-Ring Type



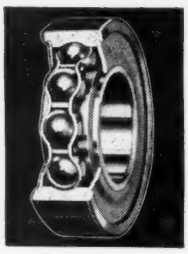
Super-Conrad
Snap-Ring Type



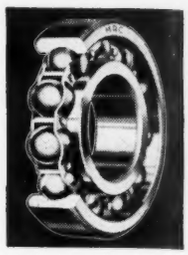
Radial Type R
Maximum-Capacity



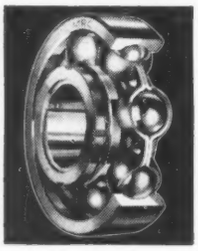
Maximum-Capacity
Single-Shielded



Maximum-Capacity
Double-Shielded



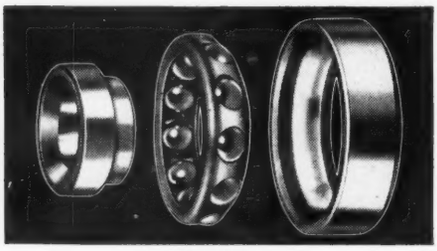
Maximum-Capacity
Notched Type



Adapter Type



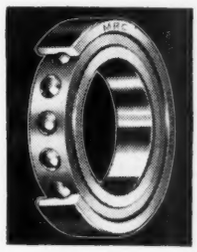
Radio-Thrust
Angular-Contact



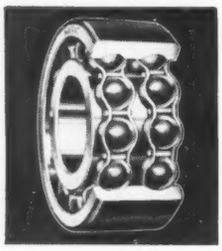
Front Wheel Bearings
Inner Race — Ball Retainer — Outer Race



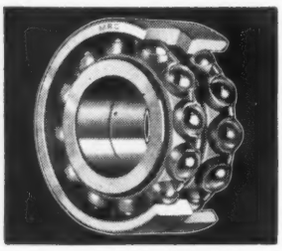
Super-Conrad Snap-Ring
Type Single-Shielded



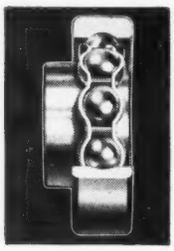
Single-Row
Extra-Light Type KR



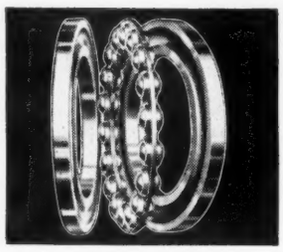
Double-Row
Maximum-Capacity Type



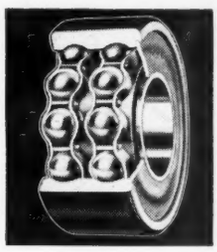
Duplex



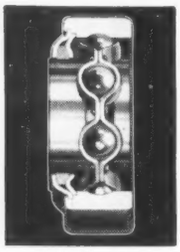
Wide-Inner
Bearing



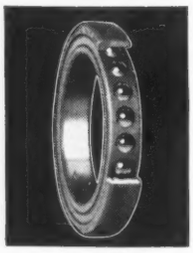
Thrust Bearing
Flat Washer Type



Double-Row
Single-Shielded



Fabri-Seal Type
with Sealing Ring



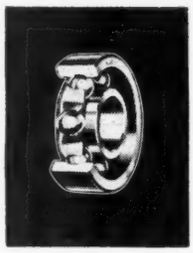
Extremely-Light
Inch-Size

"M-R-C BALL BEARING INTERCHANGEABLE TABLES"

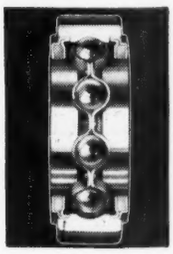
Ball Bearings of Various Makes in Numerical Order and Corresponding Sizes of M-R-C Replacements.

This bulletin contains a list of bearing numbers of over 12,000 different ball bearings made by various American ball bearing manufacturers.

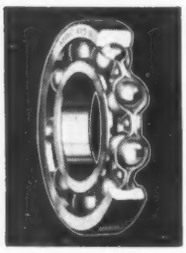
Sent free on request — Ask for Bulletin No. 26



Extra-Small
(Miniature)



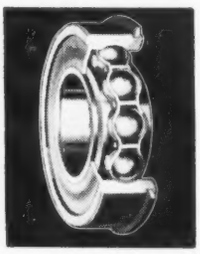
Double Felt-Seal
Shielded Both Sides



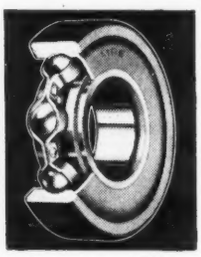
Narrow-Type
Bearing



Super-Conrad
Deep-Groove Type



Max.-Capacity Snap-Ring
Type Single-Shielded



Super-Conrad Type
Single-Shielded



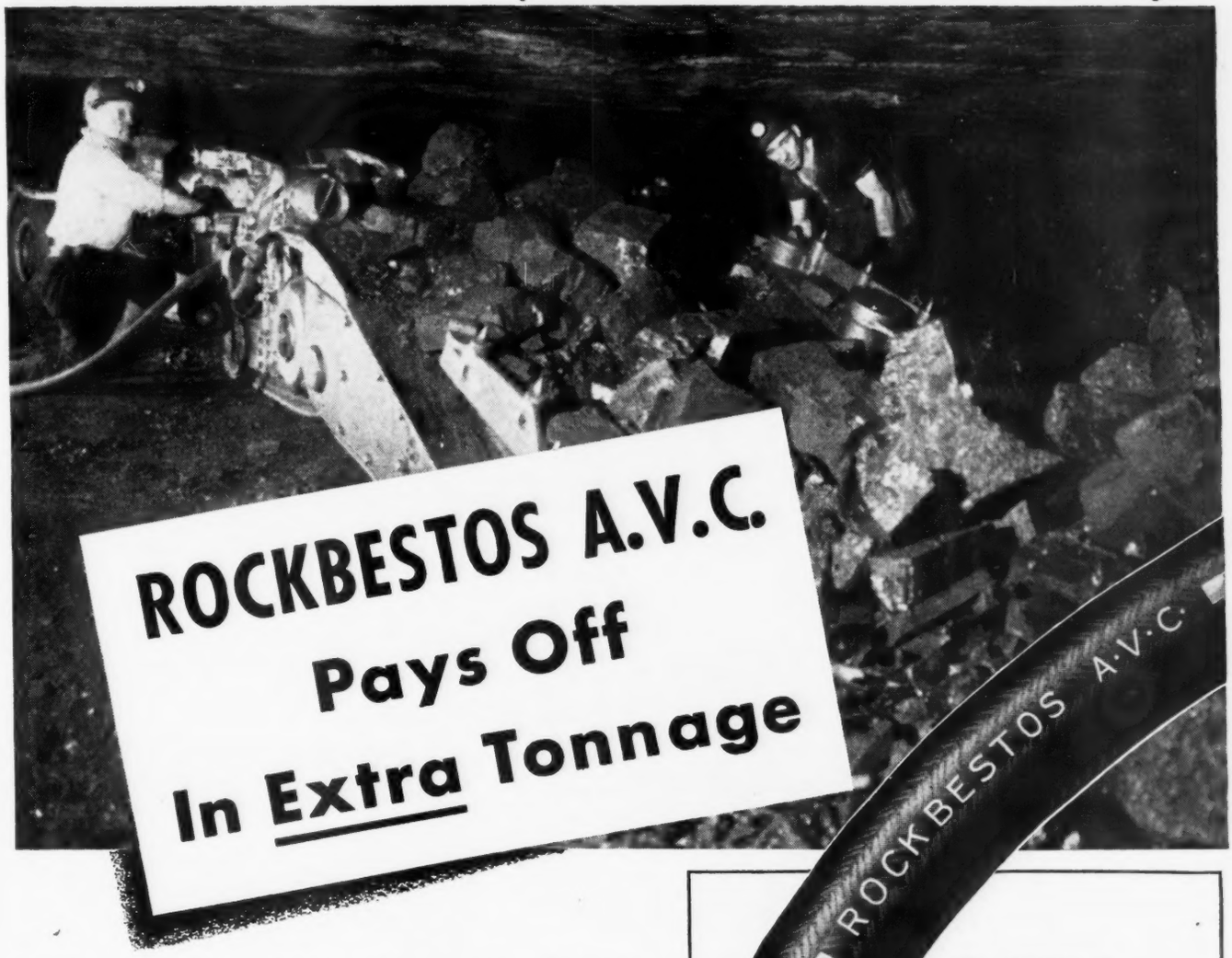
Clutch Throw-out
Plain



Clutch Throw-out
with Housing

MARLIN-ROCKWELL CORPORATION

Executive Offices: JAMESTOWN, N. Y.



ROCKBESTOS A.V.C. Pays Off In Extra Tonnage

Ask the outfits that are taking out top tonnage what cable they use for the internal wiring of their equipment and it's a good bet they'll tell you—ROCKBESTOS A.V.C.

Ask the supers why they insist on Rockbestos A.V.C. and they'll tell you that it helps them get more out of their cutters, loaders and locomotives by keeping them *on the job*—that it reduces maintenance and increases safety.

Ask the electricians why they specify Rockbestos A.V.C. and they'll tell you that it takes heat without drying out or cracking, won't bloom or rot when exposed to oil or grease, fits bushings and carries a long, trouble-free life.

Remember, tonnage goes up and *stays up* when Rockbestos A.V.C. Mining Cable goes in. A small investment pays off many times over by keeping your big investment in rolling stock working full time. Write for Bulletin 30-C and cut-back sample.

ROCKBESTOS PRODUCTS CORPORATION
Dept. M-5, Box 1102, New Haven 4, Conn.

ROCKBESTOS A.V.C.
The Wire with Permanent Insulation



The Original ROCKBESTOS A.V.C. Gives You This:

A tough, impregnated asbestos yarn braid that is resistant to heat, flame, moisture, oil, grease and alkalies.

An outer wall of impregnated felted asbestos which serves as a barrier against heat and travelling wire-fires.

Asbestos-protected varnished cambric for high dielectric strength and additional moisture resistance.

An inner impregnated asbestos insulating wall that withstands conductor-heating overloads and won't bake brittle or burn.

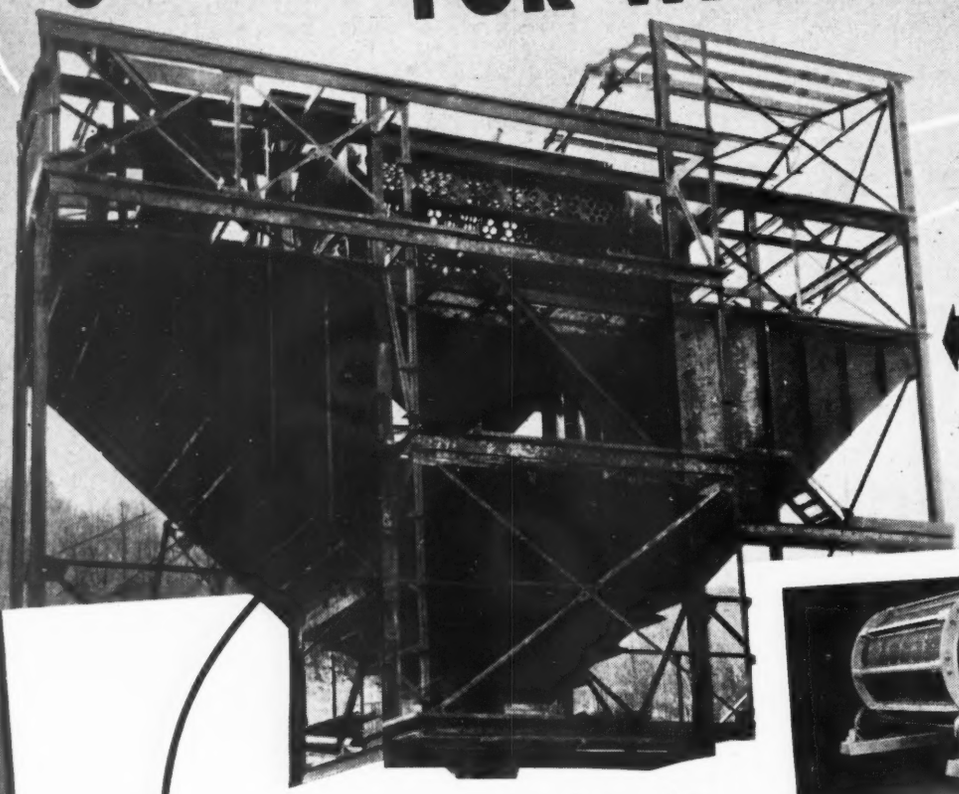
A paper separator that prevents insulation from sticking to the flexible conductor and makes stripping easy.

This construction is one of 125 developed by Rockbestos to meet severe or unusual operating conditions

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

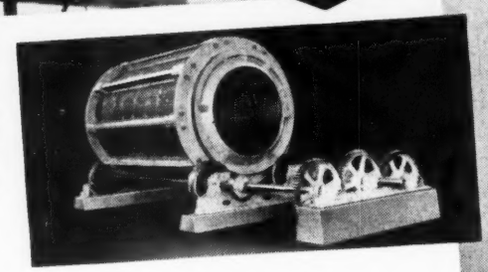
BECKLEY, W. VA.:	Beckley Mach. & Elec. Co.	EVANSVILLE, IND.:	Evansville Elec. & Mfg. Co.	PITTSBURGH, PA.:	Upson-Walton Co.
BIRMINGHAM, ALA.:	Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.:	Fairmont Supply Co.		Westinghouse Elec. Supply Co.
BLUEFIELD, W. VA.:	Superior-Sterling Co.	HUNTINGTON, W. VA.:	Banks-Miller Supply Co.	SCRANTON, PA.:	Penn. Elec. Engineering Co.
CHARLESTON, W. VA.:	Charleston Elec. Supply Co.	LOTHAIR, KY.:	Mine Service Co.	WHEELING, W. VA.:	Westinghouse Elec. Supply Co.
CLEVELAND, OHIO:	Upson-Walton Co.	MIDDLESBORO, KY.:	Rogan & Rogan Co.	WILLIAMSON, W.VA.:	Williamson Supply Co.

CONDITION YOUR R.O.M. FOR WASHING



Latest Roller Mounted "Pennsylvania" Bradford Breaker...Installed 1947

Original "Pennsylvania" Bradford Roller Mounted Breaker . . . 1918



- **Crush and Screen in a Single Operation**
- **At Lowest Possible Maintenance and Power Costs**
- **With Maximum Coarse Sizes and Few Fines**

The "Pennsylvania" Bradford Breaker reduces conditioning costs at the mine. It makes full seam mining practical and economical—removes mine debris—protects the washer. It trims good coal from binder and automatically discards the hard rock, the tramp iron and mine timbers, the sulphur balls and other refuse—everything except that which will go through the screen—and in most cases it eliminates hand picking and scalping.

The "Pennsylvania" Bradford, like other "Pennsylvania" equipment, is of massive "Steelbuilt" construction, with oversize parts at wearing points and many exclusive features of design—a crusher engineered for its specific purpose as a result of years of experience, built in capacities from 50 to 1500 tons per hour, and unequalled by other types of equipment in low maintenance cost.

We invite inquiries, will be happy to consult with you, help determine your requirements, make recommendations—and show how a "Pennsylvania" Bradford can save real money for you.

PENNSYLVANIA CRUSHER COMPANY
Liberty Trust Bldg. Philadelphia 7, Pa.

New York • Pittsburgh • Chicago • Los Angeles
Associated with Fraser & Chalmers Engineering Works, London

"PENNSYLVANIA" STEELBUILT



DRAWING A DOUBLE-BARRELED BEAD...



The two advertisements above are examples of one of the five carefully aimed campaigns conducted by the Bituminous Coal Institute—advertising to inform national and community leaders about your industry.

Planned specifically for the business and news magazines whose readers are leaders in public thought and expression, advertisements like the one on the right dramatize the *scientific strides being made by our industry toward the better utilization of coal.* Other advertisements, like the one on the left, strikingly present important facts about mine operation and modern mine communities—working and living conditions, mechanization, and the capital investment required for up-to-date mine operation.

Appearing regularly in *Time, Newsweek, Iron Age, Business Week, Look, Pathfinder* and *U. S. News,* these B. C. I. advertisements reach an audience that is important in character as well as numbers—the top people of American business, industry, professions, politics, and civic affairs.

This campaign is but one of the activities in the broad program of the Bituminous Coal Institute. With three years of solid accomplishment to its credit and with plans for an increasingly active future, Bituminous Coal Institute deserves the full support of every forward-looking Bituminous Coal operator.

BITUMINOUS COAL INSTITUTE

Washington, D. C., Affiliate of NATIONAL COAL ASSOCIATION

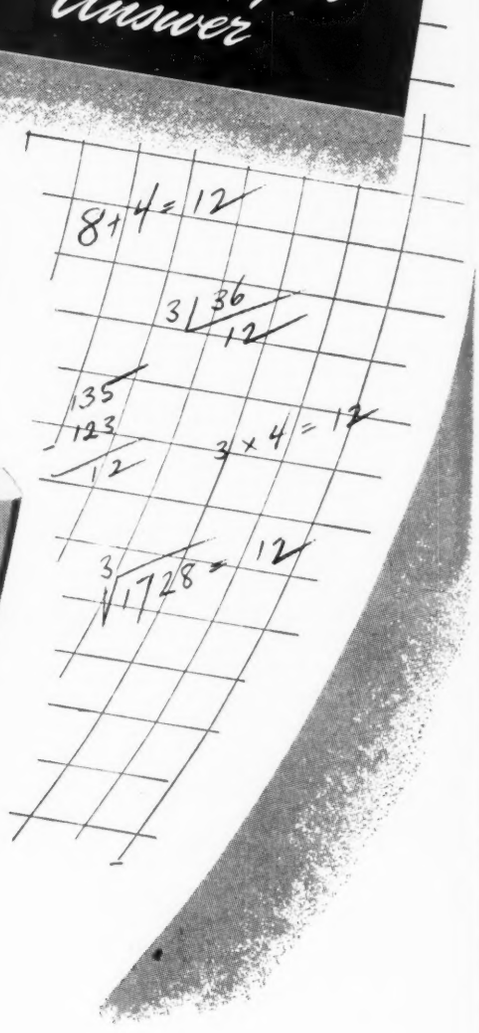
BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA

Any way you figure it

NORMA-HOFFMANN PRECISION BEARINGS

are the Right Answer





NORMA-HOFFMANN BALL BEARINGS

Rugged—thoroughly dependable for carrying thrust and radial loads.

NORMA-HOFFMANN ROLLER BEARINGS

Short, cylindrical roller design . . . heavy-duty bronze retainer . . . lowest possible co-efficient of friction under heavy load.

Norma-Hoffmann heavy-duty Bearings improve the design and performance of products wherever they are used. They are dependable, give friction-free smoothness and quietness of operation. Available in a wide range of sizes for every load, speed and duty. Write for catalog and engineering assistance.

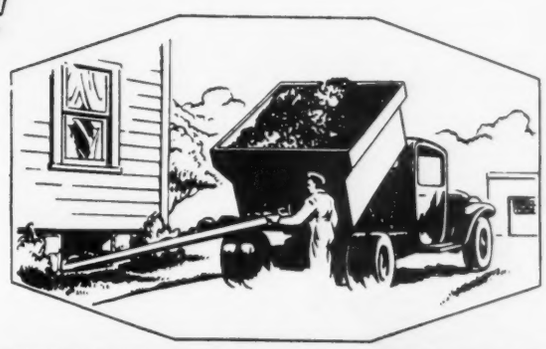
NORMA-HOFFMANN
***Precision* BEARINGS**
BALL • ROLLER • THRUST

NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT
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DUSTLESS COAL
builds summer sales

use

Ashland



PERMATREAT

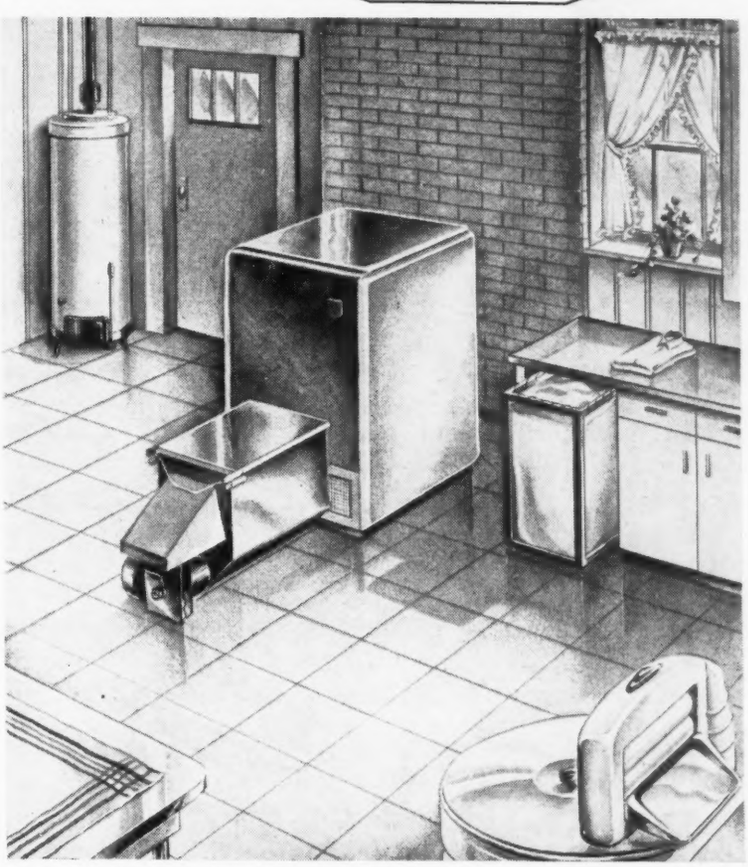
COAL SPRAY

seals in dust

Coal dealers everywhere are urging their customers to fill their bins in the spring and summer to avoid possible shortages during the consuming season next winter.

If your coal has been effectively treated with Ashland Permatreat Coal Spray, your dealers can deliver this coal now without fear of dirtying up their customers' freshly-cleaned basements and with full assurance that when the coal is used next winter, it will still be dustless and clean.

Help yourselves and your dealers by using Ashland Permatreat Coal Spray to dust-proof your coal for early delivery to domestic consumers.



Ashland
PERMATREAT
COAL SPRAY

ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY

ARE YOU STILL AN ACTIVE PARTNER...



in this "7½ billion-a-year" success?

NEVER was there a partnership like the nation-wide brotherhood of volunteers who have helped sell, advertise, and promote sales of U. S. Savings Bonds! Their program is the greatest sales operation at the lowest cost in history.

Your continued support in promoting the Payroll Savings Plan will help "America's partnership" this year to repeat or surpass last year's four-star performance, in which sales of Savings Bonds were 7½ billion dollars—*exceeding redemptions by far more than a billion!*

So keep up the splendid work—keep on telling and selling your employees the advantages of Payroll Savings: (1) ease; (2) regularity; (3) safety of investment; (4) security for the individual and the nation; (5) $4 for every $3 at maturity! And, remember, people with a stake in the future are the most stable, most productive employees.

For any help you need in conducting the Plan, call on your State Director of the Treasury Department's Savings Bonds Division.

New Savings Bonds Plan won't affect the P.S.P.

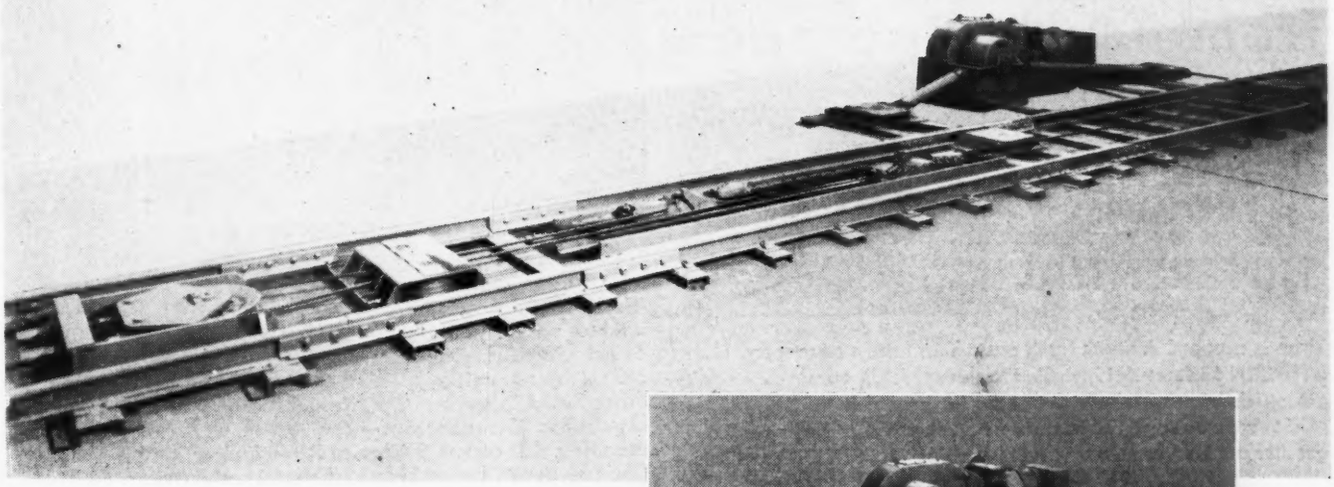
THE Treasury Department and the banks of America are making it possible for farmers, doctors, and other self-employed people to participate in "automatic" Bond buying by special arrangement with their banks. This extension of the Savings Bonds program is not a partial payment plan and is intended *only* for people who are not in a position to take advantage of the Payroll Savings Plan.

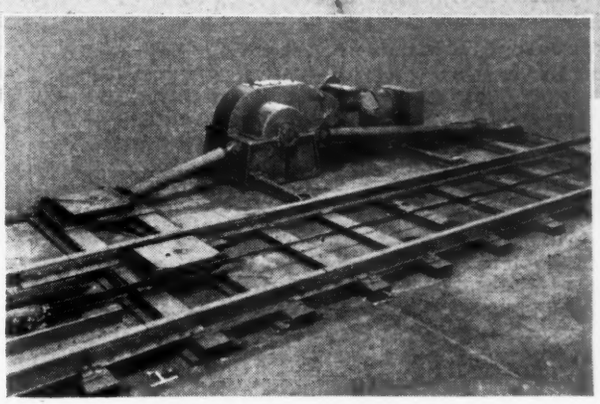
The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

For Continuous Loading...





The BROWN-FAYRO HM HOIST, showing arrangement for Double Barney application.

BROWN-FAYRO DOUBLE BARNEY CAR SPOTTER

The new BROWN-FAYRO Model HM "Double Barney" Car Spotter positions cars at the loading point and at the same time brings empty cars up—as fast as a loaded car is moved out an empty car moves into loading position. No time is lost waiting for a barney to return for as rapidly as one barney moves a car up an automatic limit switch returns a second barney to engage the following car. Loading motion is continuous and the entire operation can be controlled by one man. This hoist is equal in hauling power to a 20-ton locomotive—and will move 30 to 40 cars at a time.

Of special interest is the ability of this equipment to move and hold almost any kind of mine car, including bottom dump types.

The machine is rated 12,000 lbs. rope pull—continuous hauling speed of 40 fpm. with a 15 HP D. C. motor drive. Hoist mechanical parts are fully enclosed, oil bath lubricated and carried on anti-friction bearings. A cast and welded steel frame supports the rope drum, gearing, shafts, bearings, motor and brake. All gearing is heat-treated steel. Standard equipment consists of hoist, motor, solenoid brake, limit switch, controller, rope, sheaves, two slider type barneys and barney guides.

Complete catalog information on this hoist and other BROWN-FAYRO mine equipment will be sent on request.

THE BROWN-FAYRO COMPANY
JOHNSTOWN, PENNA

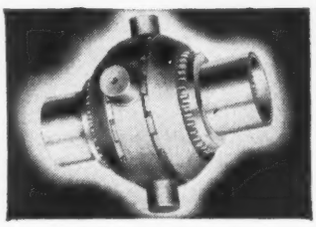
DETROIT AUTOMOTIVE PRODUCTS GIVE YOU

GREATER PROFITS

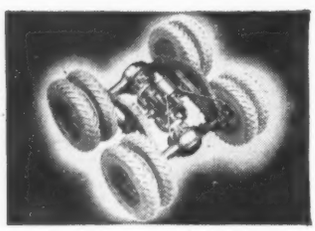
from Truck Operation

DETROIT AUTOMOTIVE

NoSPIN DIFFERENTIAL



Time is money! A stuck truck costs *both* time and money. With a NoSPIN Differential installed in your truck, your vehicle can't get stuck in mud, snow or ice as long as one driving wheel has some footing. Thousands of truck owners have realized greater profits from time saved by using NoSPIN Differentials.



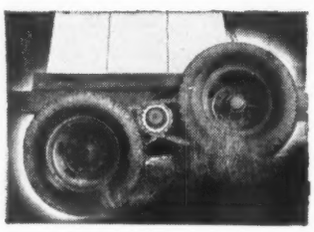
DETROIT AUTOMOTIVE

THORNTON DRIVE

Increased payloads mean increased profits! Put your medium (1½-2 ton) truck in the heavy class by installing a Thornton Drive. Four independently-driven rear wheels for greater traction, G.V.W. up to 32,000 lbs., performance and earning power increased 100%—yet you still have the economy of a medium truck.

DETROIT AUTOMOTIVE

4-CHAIN DRIVE



For heavy hauling and tough going, you can't beat the Detroit Automotive 4-Chain Drive. Installed on your heavier chassis, this rugged unit gives you a powerful six-wheeler with a G.V.W. up to 44,000 lbs. Maximum traction from positive 4-Chain drive together with big payloads mean *profitable performance* under any conditions.

DETROIT AUTOMOTIVE
PRODUCTS CORPORATION

(Formerly Thornton Tandem Co.)

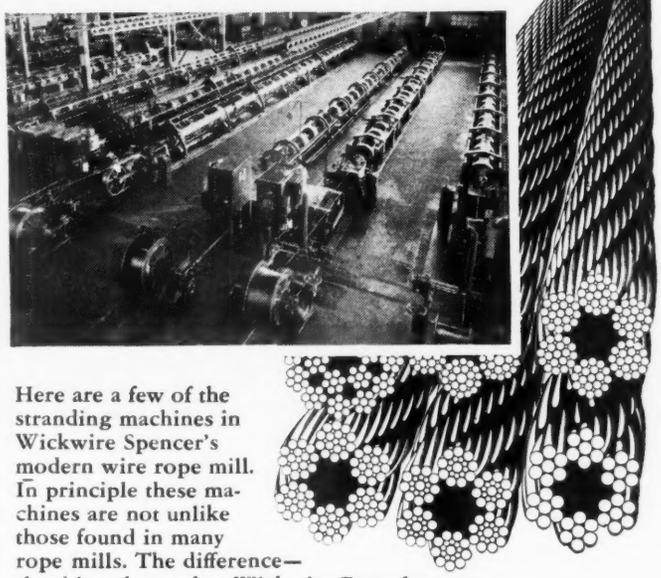
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Buy the ROPE backed by the KNOW-HOW



Here are a few of the stranding machines in Wickwire Spencer's modern wire rope mill. In principle these machines are not unlike those found in many rope mills. The difference—the thing that makes Wickwire Rope longer lasting—lies in the making of the steel and drawing of the wire used in the rope.

Only steel wire with the highest possible degree of perfection in hardness, strength, toughness and fatigue-resistance is used. And every wire used in making Wickwire Rope is drawn until it's accurate within a fraction of a thousandth of an inch.

Distributors and Wickwire Rope engineers in all parts of the country are prepared to render prompt service in solving your wire rope problems and meeting your wire rope needs. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed.

VALUABLE GUIDE FOR ALL ROPE USERS—Thousands of wire rope users have found that the information packed in the 82 pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. This easy-to-read, profusely illustrated manual is free. For your copy write, Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.



WICKWIRE ROPE

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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Parmanco

MECHANICAL FEED HORIZONTAL DRILL.

Ten years of field test has proven that our power-feed design of direct, transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of highwall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

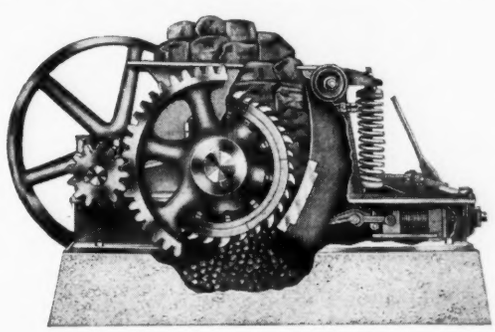
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PARIS MANUFACTURING COMPANY
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• With Automatic Steelstrut Toggle and Quick Adjustment

DEPENDABLE — ECONOMICAL



FAST — POWERFUL

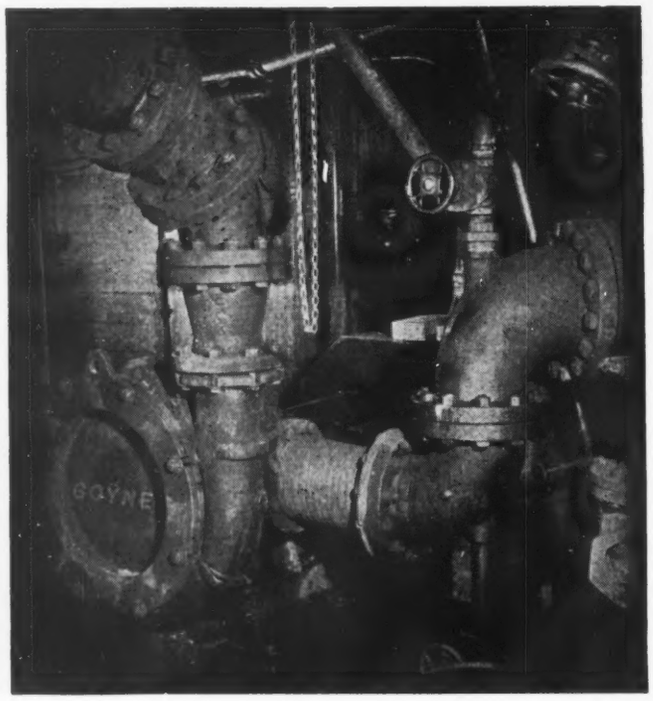
Built for "peak" production under difficult working conditions—McLanahan Black Diamond Crushers are doing an outstanding performance job for hundreds of important coal producers. For present needs or future modernization of your workings—call on McLanahan. Built in all capacities for any sized product required. Descriptive data on request.

McLANAHAN AND STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

HOLLIDAYSBURG, PENNA.

GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne.

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

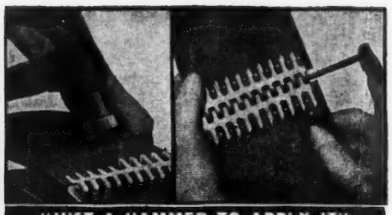
4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

BELT LACING and FASTENERS for transmission and conveyor belts



"JUST A HAMMER TO APPLY IT"

ALLIGATOR

Trade Mark Reg. U. S. Pat. Office

STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

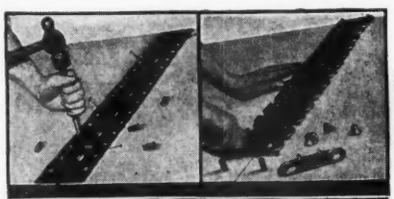
FLEXCO HD

BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

Sold by supply houses everywhere

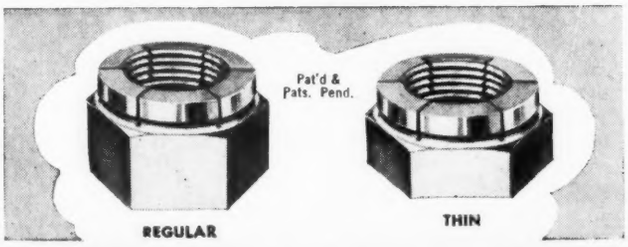


"CONVEYOR BELTS EASILY FASTENED"

FLEXIBLE STEEL LACING CO.

4638 Lexington St.
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FREE SAMPLES



FLEXLOC

SELF-LOCKING NUTS

"Flexloc" is of one-piece construction, available in U.S.S. and S.A.E. thread series and can be made in such metals as Steel, Stainless Steel, Brass, Bronze, etc. Every thread—including locking threads—takes its share of the load. "Flexloc" accommodates itself to a very wide range of thread tolerances . . . can be used over and over again without losing much of its locking torque . . . is not affected by temperatures likely to be met within the field of Mechanical Engineering . . . being a "stop" nut, it stays locked in any position on the threaded member.

It is made by the manufacturers of the unexcelled "Unbrako" Socket Screw Products—guaranteeing quality. Sizes from #6 to 1" in diameter—in both "regular" and "thin" types (shown above).

Millions of Flexlocs now in use.

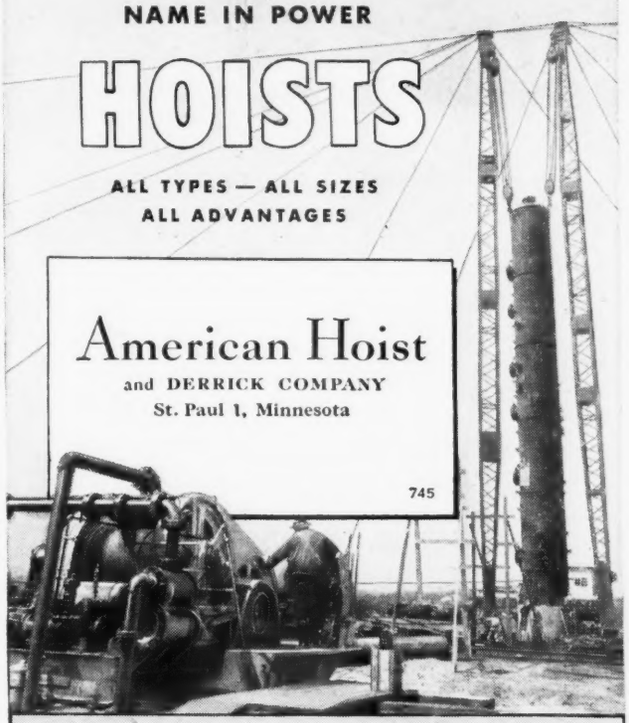
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JENKINTOWN, PA. BOX 738
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THE MOST *famous*
NAME IN POWER

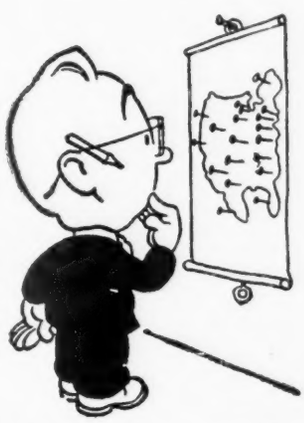
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ALL TYPES — ALL SIZES
ALL ADVANTAGES



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Your industrial supplies distributor multiplies a single outlet into hundreds, that blanket every important business center.

He is usually so conveniently near that fulfillment of an order is akin to phoning the friendly grocer over on the corner.

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All Leading Distributors Stock the *Badger* Line

ADVANCE CAR MOVER COMPANY
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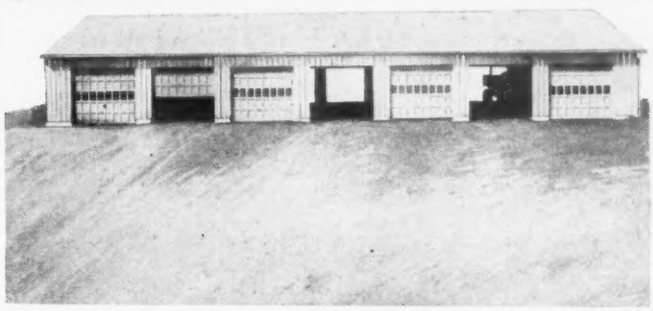
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Badger
Power King
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For all makes

Where there's Steel there's Strength

MESKER
All Steel

Specify Mesker prefabricated sectional steel buildings for your workshop, warehouse garage or utility buildings. Architects, engineers and owners prefer Mesker Buildings because they offer flexibility of design and meet every individual requirement. The above Mesker Sectional Steel Garage Building has been constructed with doors on both sides for servicing long 14-truck units used in huge strip mine operations. The roof of pressed galvanized steel sheeting and aluminum painted steel 24-gauge framework interior eliminated initial painting expense. The fireproof feature of Mesker sectional steel buildings afford substantial savings in insurance rates and repairs. Mesker buildings are portable—easily dismantled, moved and re-erected with 100% salvage. Complete catalogs and specifications on request. Write for our catalog No. C.



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—BUILDINGS—

PORTABLE ☆ FIREPROOF ☆ FUNCTIONAL

Plenty of light and working space is achieved in this garage. Permanent all-steel construction guarantees long life and low upkeep costs. Mesker exteriors have a pleasing and spacious appearance as well as being durable and practical.



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EVANSVILLE, INDIANA.

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IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

Mine Examination Questions and Answers

3 volumes — $8.25, payable in three easy installments.

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

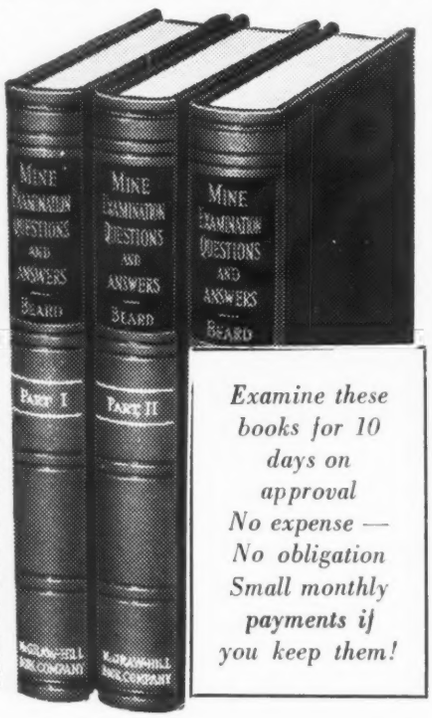
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2,000 questions given in Beard's books together with full-correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can, too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



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- PERFORATED RING — Entirely new design.
- A FIRE BOWL added between the grate and perforated ring. New type FIRE GRATE.
- ASH PIT DOOR EXTENSION to protect clean sand from ashes.
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- ECONOMY FLAME SPREADER in dome.

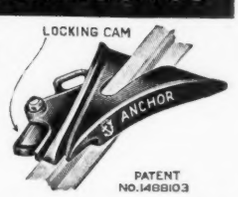
SUTTON

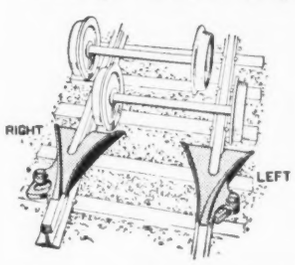
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World's Quickest Way to Rerail Cars and Locomotives

"Anchor" Rerailers Get 'Em Back on the Tracks, Saving Time, Labor, Money





- This is the quick, efficient way to get derailed cars and locomotives back into productive service. No other rerailer has the patented, scientifically-designed features of the "Anchor" Rerailer.

Smashed hands, strained backs and often fatal accidents are eliminated when "Anchor" Rerailers are used. Safety Inspectors and Engineers highly recommend their use. Made of special high carbon steel for durability and long life.

How Anchor Rerailers Work. "Anchor" rerailers are used in pairs, and will retrack wheels from either or both sides of rail at same time. Each Rerailer straddles the rail, and the narrow end on top of the rail. The derailed wheel comes up the gradual slope, and is forced back on to the rail by the guiding grooves and ridges. Can be used anywhere on the track. The "Anchor" Rerailer is the only one that has a self-contained lock.

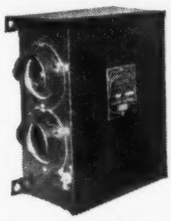
Size of Rerailer	For Use on Rails as Follows:	Locomotive or Car Capacity	Price Per Pair
No. 2	16 lbs. to 40 lbs.	10 tons	32.50
No. 3	30 lbs. to 60 lbs.	15 tons	37.50
No. 4	50 lbs. to 75 lbs.	40 tons	52.50
No. 5	70 lbs. to 100 lbs.	100 tons	80.00

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A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

Low in cost • Easy to install • Write for Catalog

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CESCO ELECTRICALLY OPERATED TRACK SWITCH

Thrown by Motorman
Operates Switch Safely • Saves Time and Money

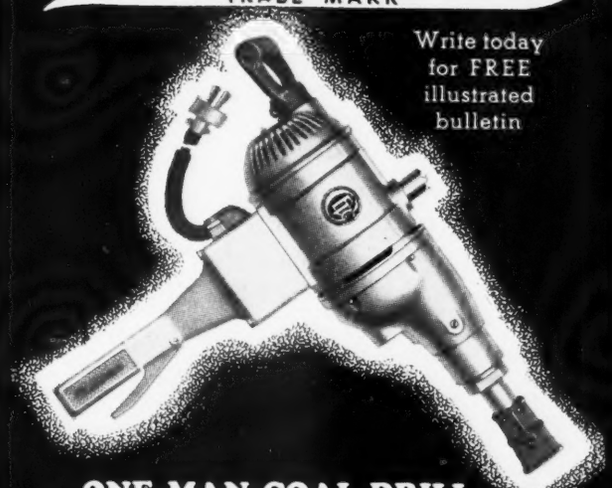
This modern track switch is thrown swiftly and safely by motormen as they sit in their cabs. It saves time and money, and is fool-proof and dependable!

Over 40 years experience manufacturing
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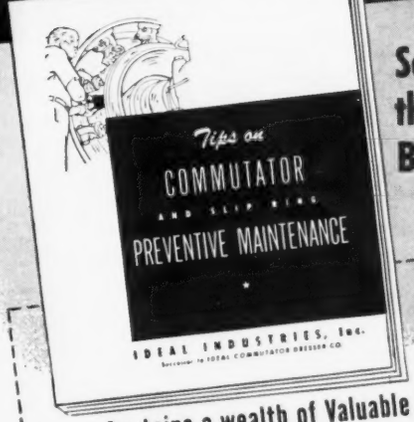


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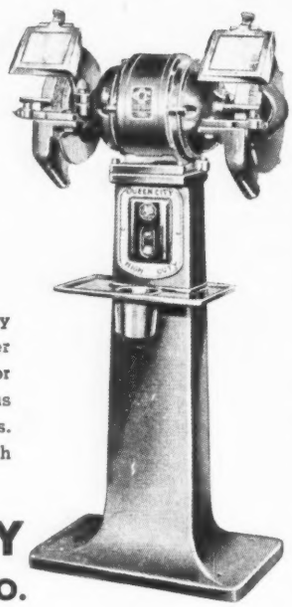
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It takes a top-quality grinder to stand up under the heavy work that pours through a mine maintenance shop. Queen City Grinders are noted for their durability, freedom from downtime, and dependable performance.



Illustrated is a Heavy Duty Queen City Floor Grinder equally adaptable to fine or heavy work. Has numerous safety and operating features. Send for catalog complete with prices and details.

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. . . invaluable for gaseous mines

If tripped by overload, moving handle to "Reset" puts the Flood City Starter back in operation. De-Ion grid contacts allow great interrupting capacity. Permits maximum motor performance — assures positive protection with no fuse necessary.



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Type Permissible Starter

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Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
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"Vibra-Flow"

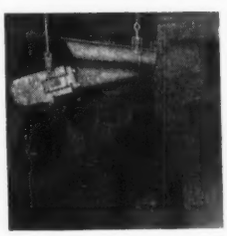


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Have 5 Distinct Features—

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THAT WILL INCREASE YOUR MATERIAL HANDLING EFFICIENCY



Write for Folder 9-46

SYNTRON CO.
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THREE and ONE-HALF MILLION DOLLARS IN NEW AND NEARLY NEW COAL MINING MACHINERY AND EQUIPMENT...

For Immediate Delivery!

HERE ARE SOME OF THE HARD-TO-GET OFFERINGS

General Electric, Westinghouse and Jeffrey Locomotives 3 to 13 ton, Trolley type.

Complete machine shop.

Jeffrey Arc Wall, 29-L.E. coal mining machines, Cat. mounted.

Goodman cutters, Cat. mounted.

Motors A.C. and D.C. all types, 1 to 500 H.P.

Controllers, starting compensators, oil breaker switches.

Ty-Rock flight conveyors.

1 Double Drum Cornical Hoist, Denver Engineering Works, 300 H.P. silent chain drive

AND OTHERS

Ridgeway motor generator sets, 225 H.P., connected to Ridgeway dynamo, 150 KW, with panelboards and transformers and motor generator sets, 300 H.P. connected to Ridgeway dynamo 200 KW., complete with panelboards A.C. and D.C. meters, transformers, etc.

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Joy 7—BU coal loaders, Cat. mounted with high pedestal.

Joy shuttle car elevating conveyors.

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400—2 ton Steel Tipple Cars, roller and ball bearing.

Electric Products Company battery charging motor generator sets.

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Manerre Engineering & Machine Company and Attumwa box car loaders.

Rails 30 lbs. to 75 lbs., spikes, bolts, tie plates, frogs, switches, and switch throws.

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$150,000 worth of new parts and bearings for Joy, Jeffrey, Goodman, Manerre, Attumwa, and other popular manufacturers equipment.

Also hundreds of items too numerous to mention

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from 1000 acres up, suitable for stripping up to 50 ft. overburden. By stripping contractor equipped with shovels, bulldozers, trucks, and all other necessary equipment. Finishing up the present job within 60 days or so. Please furnish coal analysis, thickness of the coal, name of the seam, kind of overburden. Will go anywhere in the United States or Foreign. Address W 415, Coal Age, 330 W. 42nd St., New York 18, N. Y.

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STRIPPING CONTRACTORS

With equipment sufficient to produce 2,500 tons daily. 2,000 acres of Sewel, Beckley and Firecreek Seams.
Best Proposition in U. S. A.

WW411—Coal Age, 330 West 42nd Street, New York 18, N. Y.

MECHANIZED COAL MINE

840 acres land with estimate of over 1,500,000 tons of coal, completely equipped. Market and demand for 200 tons per day. Complete details upon request. Priced at $45,000.

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STRIP MINE WITH EQUIPMENT OR MODERN MECHANIZED DEEP MINE NOW IN OPERATION. ONLY LARGE ACREAGE OR STRIPPABLE OR DEEP MINE COAL CONSIDERED. INTERESTED ONLY IN AMORTIZING THROUGH TONNAGE. CAN FURNISH EXCELLENT REFERENCE AND CREDIT RATING. PREFERENCE WEST VIRGINIA OR EASTERN KENTUCKY. REPLIES HELD IN STRICTEST CONFIDENCE.

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For Capital Stock or Assets of
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By large financially powerful diversified organization wishing to add another enterprise to present holdings.

Existing Personnel Normally Retained

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Suitable for strip mining. Complete details upon request.

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For Sale—Two Coal Tipples

1—4 Track steel tipple, 2000 ton daily capacity.
1—3 Track wood tipple, 1200 ton daily capacity.
Complete with motors, crushers, conveyors, etc.

Boonville Coal Sales Corp.
Boonville, Indiana

WANTED

—TRANSFORMERS—



TRANSFORMERS WANTED

in operating condition or burnt out. Mail us list giving complete nameplate data and stating condition.

We Rewind, Repair and Redesign all Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR

THE ELECTRIC SERVICE CO., INC.
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¾ to 4 yard Shovels
2 to 8 yard Draglines

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***Telephones:* 4910J and 4911**

WANTED TO BUY
MINING MACHINE

One—#35-BB Used Jeffrey 50 H.P. Mining Machine, in good condition, completely equipped for operation on 250 volt direct current.

W-409, Coal Age,
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WANTED TO BUY
HEAD AND TAIL END

One, Type 52-B Head and Tail End for 26-inch Belt Conveyor, with 25 H. P. motor, 230 Volt D. C. power, including control panel.

CANNELTON COAL AND COKE CO.
Cannelton, West Va.

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BOX NUMBER

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WE HAVE JUST PURCHASED AND OFFER FOR SALE ALL MACHINERY, EQUIPMENT AND SUPPLIES of The American Smelting and Refining Company's Cokedale Coking Plant and Boncarbo Coal Mine

LOCATION: Near TRINIDAD, COLORADO

TROLLEY LOCOMOTIVES
9—36" ga. Trolley Locomotives, from 4½ ton to 9 ton, some with crab and reel.

COAL CUTTERS
8—Sullivan CE7, with standard trucks.

MINE FANS
1—8-H60 Aerodyne Mine Fan, complete with air locks, Hood, Cage and Hoist. Practically new, latest type.

RAIL
100 Tons—65 lb.
300 Tons—60 lb.
40 Tons—40 lb.
140 Tons—30 lb.

RAILROAD SCALES
3—Fairbanks, Steel Stringers.

COAL CRUSHERS
2—30" Jeffry.
1—36" St. Louis, Ring Type.
1—10x24 Sling-Hammer Mill.

CONVEYORS—DRAG CHAIN AND BELT
Belt Conveyors, 24" to 36", from 40' to 360' Centers.
Drag Chain Conveyors, 12" to 24", from 50' to 150' Centers.

PIT CARS
340—Card 1.7 Ton Capacity. Used on Rocker Dump.
1—Card Rocker Dump Rock Car, Practically new.

MINE LAMPS
188—Model P Edison, with Charger and racks.

MACHINE SHOP EQUIPMENT
1—24"x10' American Quick Change Lathe.
3—Drill Presses from 16" to 28".
1—Pipe Threader up to 2".
1—Bolt Threader up to 1⅜".
1—Smith Electric Welder.
1—Shaper.
Grinders, Vises, etc.

OFFICE EQUIPMENT
Adding machines, Electric calculators, Typewriters, Desks, Chairs, Office Safe, Filing Cabinets, etc.

MISCELLANEOUS
1—150 KW 250 Volt DC Generator with Motor.
Miles of 2/0 and 4/0 Trolley Wire.
Miles of R.C. Stranded Insulated Wire.
Miles of Pipe 2" to 6".
Swing Cranes with 1½ to 2 Ton Y & T Chain Blocks.
Mine Transits.
Wooden and Metal Mine Phones.
I Beams 12" to 18", Long Lengths.
4—Larry Cars, 250 Volts DC.
2—Coke extractors, 250 Volts, DC.
$30,000.00 worth of new mine supplies.
Coal Washers.
2—1935 Ford Busses, 40 passenger capacity, Jacks, Rail Benders, Motors, Hoists, Coke Oven Equipment and Supplies.

Write for Complete Inventory of This Plant

FLORENCE
MACHINERY AND SUPPLY COMPANY

SUITE 904, EQUITABLE BUILDING **DENVER 2, COLORADO**

Phone: Alpine 2803
Yards: Denver and Florence, Colorado

FOR SALE

LOADING MACHINES
8—11-BU Joy, 250 volt DC, 42" gauge.
5—8-BU Joy, 250 volt DC, 42" gauge.
5—7-BU Joy, 250 volt DC, 42" gauge.
7—L-400 Jeffrey, 250 volt DC, 42" gauge.
3—#3 Myers-Whaley, 250 volt DC.

MINE CARS
200—3-ton all steel end dump, 27" high, 42" gauge, Timken roller bearing.
500—4-ton rotary dump, 42" gauge, Timken roller bearing.

LOCOMOTIVES
3—13-ton Goodman, type 136-B, 250 volt DC.
2—13-ton Westinghouse, type 908-C, 250 volt.
2—8-ton G. E., type HM-822, 250 volt DC.
8—6-ton Goodman, type 33, 250 volt DC.
6—6-ton G. E., type HM-803, 250 volt DC.

CUTTING MACHINES
5—29-LE Jeffrey, 250 volt, track cutters.
4—35-B Jeffrey, 250 volt DC, 42" gauge.
15—112-AA Goodman Universal, 250 volt, on tip-turn trucks, cable reel and cable.
8—7-B Sullivan Shortwall, 250 volt, on tip-turn trucks.
10—Jeffrey 24-L, 250 volt, permissible type longwall. Five years old.
6—12-CC Goodman Shortwall, 250 volt DC.

We will soon have to offer all the equipment from a 5000-ton mine, including Motor Generator Sets, Rotary Converters, Steel Tipple, Electric Hoists, Mine Cars, Copper wire and Rail. Other items too numerous to mention.



Frank J. Wolfe

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING — L. D. Phone-34 — TERRE HAUTE, INDIANA

ROTARY CONVERTERS

500 KW GE. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal Type. 2300 V. Transformer and Switchgear.

300 KW GE. SYN., 575 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers and Switchgear.

150 KW WEST. SYN., 275 V., 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers and Switchgear.

MOTOR GENERATORS

500 KW GE. SYN., 575 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.

300 KW RIDGWAY Syn. 275 V., 2200 V., 3 Ph. 60 Cy., 1200 RPM. Complete Manual Switchgear.

150 KW GE. SYN., 275 V., 2300 V., 3 Ph., 60 Cy., 1200 RPM. Complete Manual Switchgear.

150 KW R. W. SYN., 275 V., 2300 V., 3 Ph., 60 Cy., 900 RPM. Complete Manual Switchgear.

LOCOMOTIVES

18-T WEST., 250 V. 908C Mts., 36"-44" Ga.
18-T G.E., 500 V., HM-827 Mts., 36"-42' Ga.
18-T G.E., 250 V., HM-827 Mts., 36"-42" Ga.
10-T JEFFREY, 250 V., MH-110 Mts., 36"-48" Ga.
10-T WEST., 500 V., 907-C Mts., 36"-44" Ga.
10-T WEST., 250 V., 907-C Mts., 36"-44" Ga.
8-T WEST., 500 V., 907-C Mts., 42"-46" Ga.
8-T WEST., 250 V., 906-C Mts., 42"-48" Ga.
6-T G.E., 250 V., HM-701 Mts., 30"-36" Ga.
6-T WEST., 250 V., 903-B Mts., 22"-30" Ga.

Each unit listed above is owned by us and is available now for immediate purchase

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building, Pittsburgh, Pa.

COAL CUTTING MACHINES

1—35B Jeffrey Shortwall 250 V. D.C.
1—35BB Jeffrey Shortwall A.C.
2—29C Jeffrey Arcwall 250 V. D.C.
1—134 E. J. Goodman Slabbing 250 V. D.C.
1—36B Jeffrey Longwall 250 V. D.C.
1—12GS Goodman Shortwall A.C.

LOCOMOTIVES

1—8½ Ton Trolley Locomotive.
1—5 Ton Goodman with 2 Type 41 250 V. Motors.
1—5½ Ton Iron Storage Battery Locomotive.
1—6 Ton Jeffrey with MH88 250 V. Motors.
1—6 Ton G. E. Storage Battery Locomotive with 2 HM825 Motors.

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1—400 HP Allis-Chalmers SC 3/60/2200/1150.
1—250 HP G. E. Slipring 3/60/2200/600 RPM.
1—200 HP West. type CVV, Slip Ring 3/60/2200/514 RPM.
1—900 HP G. E. Synchronous Motor 3/60/220/1720.
1—185 HP Burke SC 3/60/2200/1150.
1—150 HP Westinghouse CS 3/60/440/600 RPM.
1—100 HP Synchronous Motor 3/60/440/1200.
2—100 HP Ridgway 2 Speed Squirrel Cage Motors 720/860 RPM, 3/60/2200 V.
1—75 HP G. E. Type I Form M Slipring. 3/60/440/720.

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3—300 KVA 4000 to 440 V.
3—150 KVA Pittsburgh 1/60/6600/220/440 V.
3—150 KVA G. E. 1/60/2300 to 575 V.
3—100 KVA G. E. 1/60/2300/230/115 V.
1—50 KVA West. 1/60/2300/220/440 V.
1—87½ KVA Pittsburgh 1/60/2300/220/440 V.
2—25 KVA G. E. 1/60/2300/220/110 V.
2—15 KVA 1/60/2300/220/110 V.
1—10 KVA 1/60/2300/220/110 V.
1—7½ KVA 1/60/2300/220/110 V.

COAL CRUSHERS

1—36"x36" Jeffrey S. R. Coal Crusher Gear Drive.
1—18"x18" Same Except Belt Drive.

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1001 Washington Boulevard
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NEW MOTORS

In Stock—Immediate Shipment.

3 HP — 1200 RPM
5 HP — 1200 RPM
7½ HP — 1200 RPM
7½ HP — 1800 RPM
10 HP — 1200 RPM
15 HP — 1200 RPM

220/440 volt, 3 phase, 60 cycle, BALL BEARING, type AR Allis-Chalmers Squirrel Cage Induction Motors, open type.

R. H. Benney Equipment Co.
5024 Montgomery Road, Norwood,
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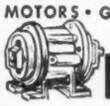
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WIRE INQUIRIES COLLECT

AMERICA'S LARGEST STOCK
NEW AND REBUILT
MOTORS • GENERATORS • TRANSFORMERS



BOUGHT and SOLD
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, NEW YORK

FOR SALE

1 512 Goodman Shortwall Machine, 210 volt.
2 Goodman Slabbing Machines, permissible type, 250 and 500 volts.
Shaker Conveyors and duckbills.
AC Welders 220/440 volts, 350 and 400 Ampere.
1 Myers-Whaley #4 Automat Loader.
Coal Crushers—single roll.
30" x 30".
36" x 60".
36" x 36" and smaller.
1 Blue print machine, 42" wide, continuous Mercury Arc Light.
Lathe 48" x 14' with Taper Attachment and 3-60-220 Motor.
Milling Machines, horizontal and vertical.

Guyan Machinery Company
Logan, W. Va.

NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

FOR SALE

B-E 52B 2-1/3 yd. dragl.-shovs., Diesel, elec.
Marion 20-yd. dragline, elec., Model 5600.
Marion-Monighan 7 and 3-yd. Walking draglines.
B-E 50B shovels, Diesel, electric, steam.
P&H 2-yd. electric shovel, 750-B.
B-Erie 120B, 4-yd. electric shovel.
Locos., 8 to 80 tons, gas and steam.
Shovel front attach., 2-1/3 yd., 52-55B.
Crane boom, 40', 1¼-yd., 46" base width.
H. Y. SMITH CO., 828 N. B'way, Milwaukee 2, Wis.

WIRE ROPE FOR SALE

Brand New—Ind. Wire Rope Center, 1¼" dia. 6x19. Plow steel. Various lengths from 160 ft. to 8,000 ft. each reel. Also other sizes. Send for list.

TERRY WYNN
Box 118 Wash. Bridge Sta., N. Y. C.

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—200 KW. 720 rpm. 250/275 v. Crocker Wheeler Generator V-belted to a 300 HP, 360 rpm. 2200 v. General Electric 3 ph. 60 cy. synchronous motor.

1—200 KW. 250/275 v. 1200 rpm. Elliott Generator direct connected to 1—3 ph. 60 cy. 1200 rpm. 2300 v. Allis-Chalmers motor.

1—200 KW. 125/250 v. 3 wire 1200 rpm. General Electric Generator direct connected to 1—3 ph. 60 cy. 1200 rpm. 2300 v. Allis-Chalmers induction motor.

1—200 KW. 125/250 v. DC Motor Generator Set consisting of 2—100 KW. 125 v. DC 1200 rpm. General Electric Generaotrs, direct coupled to 1—225 HP. 1200 rpm. 220 or 440 v. 3 ph. 60 cy. Westg. CW motor.

1—175 KW. 250/275 v. Crocker Wheeler Generator direct connected to 1—3 ph. 60 cy. 2200 v. Ridgeway synchronous motor.

1—200 KW. 690 rpm. 250/275 v. DC compound wound Crocker Wheeler Generator direct connected to 220/440 v. or 2200 v. 3 ph. 60 cy. motor.

1—175 KW. 250/275 v. compound wound 1200 rpm. Elliott Generator direct connected to a 3 ph. 60 cy. 440 v. 1200 rpm. Westinghouse induction motor.

1—150 KW. 720 rpm. 250 v. DC compound wound interpole type CD G. E. Generator direct driven by 1—2300 v. 720 rpm. 3 ph. 60 cy Elliott Ridgway synchronous motor.

1—150 KW 500 v. compound wound Ridgway Generator 273 amps. 900 rpm. direct connected to a 225 HP. 2200 v. 3 ph. 60 cy. Ridgway synchronous motor.

1—150 KW. 720 rpm. 250 v. DC General Electric Generator direct driven by 1—175 HP. 2300 v. 720 rpm. 3 ph. 60 cy. Elliott synchronous motor.

1—150 KW. 3 wire Motor Generator Set consisting of 2—100 KW. 125/250 v. 1200 rpm. General Electric DC Generators direct connected to 1—3 ph. 60 cy. 1200 rpm. Westg. CW motor.

1—100 KW. 515 rpm. 250/275 v. type MPC General Electric Generator direct connected to 125 HP. General Electric 220 or 440 v. or 550 v. 3 ph. 60 cy. squirrel cage motor.

1—75 KW. 900 rpm. 250/275 v. DC compound wound Generator direct connected to 1—100 HP. 3 ph. 60 cy. 220 or 440 v. Wagner Fynn Weischel synchronous motor 900 rpm.

4—75 KW, 600 rpm. 250/275 v. General Electric Generators direct connected to Crocker Wheeler 220 or 440 v. 3 ph. 60 cy. squirrel cage motors.

3—50 KW. 1150 rpm. 250 v. DC type SK Westg. Generators direct connected to 220/440 v. 3 ph. 60 cy. motors.

PUMPS

1—11 GPM 460 ft. head Worthington Oil Pump.
1—60 GPM 479 ft. head Gould Pump.
1—100 GPM 50 ft. head Dayton Dowd Pump.
1—130 GPM 50 ft. head Dayton Dowd Pump.
1—160 GPM 50 ft. head Dayton Dowd Pump.
1—195 GPM 200 ft. head National Transit Pump.
1—210 GPM 60 ft. head National Transit Pump.
1—243 GPM 100 ft. head Dayton Dowd.
1—220 GPM 231 ft. head 3½"x3" Blackmer Pump.
2—243 GPM 100 ft. head Dayton Dowd.
1—300 GPM 90 ft. head Dayton Dowd Pump.
2—300 GPM 20 ft. head Gardner-Denver Pump.
3—378 GPM 44 ft. head Dayton Dowd.
1—450 GPM 104 ft. head Dayton Dowd Pump.
1—500 GPM Morris Machine Wks. 4" sucs. 4" dis. 123" head 1760 rpm.
1—550 GPM 88 ft. head Dayton Dowd Pump.
3—750 GPM 70 ft. head Dayton Dowd Pumps.
1—4000 GPM 138 ft. head Ingersoll Rand Pump.

230 V. DC MOTORS

HP	Make	RPM	Type
15	Reliance	1150	...
15	G. E.	1100	CE
15	Al. Ch.	800	
15	Westg.	560	S-7
20	Westg.	975	S
20	Westg.	1100	SK
20	Westg.	600	M
25	G. E.	650	MD
30	Westg.	700	S-6
40	Westg.	625	MC
80	Westg.	450	76-A
175	G. E.	450 or 550	MD
200	Cr. Wh.	600	CCM
250	.....	850	...
400	Westg.	150	...

CONVEYORS

3—G-20 Goodman Shaker Conveyors each with a Goodman Duck Bill complete with motor equipment with 250 v. DC motors.

ALTERNATING CURRENT MOTORS

HP	Make	3 ph. 60 cy. Type	Volts	RPM
30	G. E.	KT—Sq. Cg.	400	900
35	G. E.	I—Slprg.	220/440/2200	865
40	Westg.	CCL—Sq. Cg.	440	900
40	G. E.	KT—Sq. Cg.	220/440	1200
50	Cr. Wh.	Sq. Cg.	440/220	505
50	Lincoln	—Sq. Cg.	220/440	1050
60	G. E.	I—Sq. Cg.	220/440/550	320
60	Cr. Wh.	SC—Sq. Cg.	440/220	600
75	G. E.	I—Sq. Cg.	220/440/550	340
85	G. E.	I—Sq. Cg.	220/440/550	400
100	G. E.	K-Sq. Cg.	220/440	1745
100	Triumph	C-17—Slprg.	220/440/550/2200	580
100	Westg.	CS—Sq. Cg.	440 v.	690
100	Fynn-Wlcl.	31-V-RN Sq Cg.	220	900
125	G. E.	I—Sq. Cg.	220/440/550	515
150	Al. Ch.	Syn.	220/440	277
175	El't Rgwy	Sq. Cg.	2300	720
200	Cr. Wh.	SR—Slprg.	440/220	505
200/250	Westg.	CW—Slprg.	220/440	1800
2-200	Westg.	CW—Slprg.	220/440	1200
300	G. E.	TS—Syn.	2200/550/440/220	360
400	Westg.	CW—Slprg.	2200	435
450	Cr. Wh.	SR—Slprg.	2300	392

Note: LARGE STOCK OF SMALL MOTORS—AC and DC.

COMPRESSORS

2—315 CFM Ingersoll Rand portable 100# pres. driven by 105 HP Waukesha Oil Engines, 860 rpm.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH [6], PA.

FOR SALE

CRUSHERS

1—Stephens Adamson 30 x 30 double roll crusher. Will crush from 20" down to 1¼".

1—Link Belt 36 x 60 double roll crusher equipped with gear drive.

1—24 x 36 McNally Pittsburg crusher, single roll, #9-36-335, maximum feed size 16", capacities 100 TPH 1¼", 190 TPH 4", 290 TPH 8".

FAN

1—Bayley #17 Plexiform fan, type F, wheel diameter 93½", circumference 24.478 ft. outlet area 39.376 sq. ft. Capacity ranges from 39376 CFM at outlet velocity of 1000 to 141750 CFM at outlet velocity of 3600.

HOIST

1—Ottumwa silent chain drive hoist, drum inside face 30", inside flange 7", drum diameter 36", 90 teeth on big gear, 25 teeth on pinion gear, overall length 7' 9", overall width 9', overall height 5' 6", complete with 40 hp General Electric slip ring motor, 3 phase, 60 cycle, 220 volts, 900 rpm, with reversible controller and resistance. Rope speed 290' per minute. 130 teeth on chain drive gear, 16 teeth on motor pinion.

LOCOMOTIVES

1—4 ton Goodman locomotive, type 75AO4T, #5050, overall length 15' 10" width 47", height 32", wheelbase 44", gauge 28". Gauge can be changed to 24", or 42". Ball bearing motors and journals, 250 volts, DC, continuous strip grids, equalizers, and spring bumpers.

1—5 ton Goodman locomotive type W-1-2A5, #983 overall dimensions, length 11', height 30", width 47", wheelbase 31", 42" gauge.

1—5 ton General Electric locomotive, classification LM-2T5-DD, serial number 6274, 250 volts DC, 36" gauge, 45" wide overall, 30½" frame height, overall height 36", 44" wheelbase, 24" wheel diameter, 12'6" long bumper to bumper, R86E type controllers.

1—6 ton General Electric locomotive, classification LM-2T8-MM5, serial number 5837, 250 volts DC, 36" gauge, 45" wide overall, 33" frame height, 38½" overall height, 44" wheelbase, 30" wheel diameter, 13' long bumper to bumper, R86E type controllers.

1—6 ton Goodman locomotive #4876, type 13314T, 250 volts, ball bearing motors, 42" gauge, wheelbase 44", length 14', width 54", height 35½".

PUMPS

1—Gould Centrifugal pump 3" suction, 2" discharge, capacity 225 GPM, at 105' head, complete with 10 HP Westinghouse motor, 3 phase, 60 cycle, 220/440 volts, 1750 rpm, and magnetic starter.

MINING MACHINES

1—Sullivan shortwall mining machine CE7, AC, 3 phase, 60 cycle, 220 volts, 44" gauge, 6½ ft. cutter complete with tip turn truck.

2—Sullivan Longwall mining machines, 3 phase, 60 cycle, 220 volts, AC, type CH8, 30" cutter bars, complete with 300 ft. each of 3 conductor mining machine cable.

We are distributors for John A. Roebling Sons Company wire rope and fittings.

GAVENDA BROTHERS

CANTON, ILLINOIS

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30B, 43" 1—5 ton.
1—5 ton, W-1-2, 36".
2—5 ton, 2600 K.
2—6 ton, 33-1-4-T.
2—8 ton, 32-1-4-T.

Westinghouse: All 250 volts.
1—4 ton 902, 48" with crabs.
4—904 c. 44" 500 volts and 250 volt. Also 906 motors and 102-904-115.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt
6 ton 803, 44" as is
6 ton 823, 44"
6 ton 801
8 ton 839
4 ton 1022, 44", as is
5 ton 825, 44" & 36"
8 ton 839 motors
Battery Locomotive, Ironton, Whitcomb and 1½ ton Mercury.

Jeffrey: 6 ton and 4 ton, all gauges. 250 volt. 8 ton, 250 and 500 volts, 10 ton, MH78, 500 volts.

MINING MACHINES

Jeffrey: 2—35B, 28A, 250 V, 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C.

Goodman: 12A, 12AB, 12AA, 512, 12G3A, 424, 24B, 124E3.

1—12G3, 220 volt and 2—142 DA, 500 volt.

2—Permissible Type 12CA. 6—112AA. Motors for 212AA, both 250 and 500 v.

1—Hitch Cutter for Cross Head timbers.
Sullivan: CE7, CE9, CE10, CR10 Low Vein.

SUBSTATIONS — 275 volts, D. C.

1—150 KW G. E. MG Set.
1—300 KW Westing. Rotary.
1—150 KW West. MG Set.
1—100 KW Westinghouse M-G Set.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, and MH 64-350 Volts and 500 V. 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 33-1-4-T, 31-1-4-T, 32-1-4-T. **General Electric** 801, 803, 807, 819, 821, 825, 839. **Westinghouse** 904, 905, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V Bracket Type, 150 KW G.E., HCC Bracket Type. **Sullivan** CE7, CE9 and CE10.

AERIAL TRAMWAYS • HOISTS • PUMPS • MOTORS • TRANSFORMERS • BOND WELDERS • RESISTANCE • COMPRESSORS • DUPMS • SPEED REDUCERS • FIELD FRAMES • MOTOR STARTERS AND CONTROLLERS—AC & DC • DROP BAR SUPPORTS (Gooseneck), 29B and 29C • MINING MACHINE TRUCKS • SWITCHBOARDS • CIRCUIT BREAKERS—AC & DC • COAL CRUSHERS (double roll) 16"x16", (single roll) 24"x36", 24"x24", 36"x36", 30"x60", 30"x30", 18"x18" •LATHES, SWICHES • AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps • MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps • HOISTS, overhead, AC 3-60-440 1 ton and 2 ton • 1 clam shell bucket 1¾ cubic yard • MINE CARS • 2 SULLIVAN BIT SHARPENERS • R. R. SWITCHES 85± to 100± GENERATORS DC 250-275 volt, 30 KW to 100 KW. • Also SPARE MOTORS DC and AC for mining machines and locomotives. BELT CONVEYORS, SLATE LARRY, 2—5BU on Cats. 18BU on Cats. 2—Myers-Whaley, ±3 and ±4. LOADING MACHINES and Goodman Shaker Conveyors and Duckbills. PLANTS, 50 KW to 250 KW. 4—WESTINGHOUSE 55 KVA Rotary Transformers, Voltage 23100/208. Synchronous Motor Starters full Magnetic Across-the-line, 3 phase, 60 cycle, 4150 Volts—2—200 H.P. and 6—250 H.P. Westinghouse.

GUYAN MACHINERY COMPANY, Logan, W. Va.

SYNCHRONOUS ROTARY CONVERTERS

Qu.	KW	Make	Speed	D.C.V.
1	500	Whse.	1200	600
1	300	Whse.	1200	275
2	300	Whse.	1200	600
1	300	G. E.	1200	600
2	175	Whse.	1200	275
1	175	G. E.	1200	275

TRANSFORMERS

1—200 KVA Kuhlman, Cont. Duty, Auto. 3800-2300/3/60.
3—37½ KVA Pitts. Cont. Duty, Auto. 6900-2300/1/60.

MOTORS

1—80 HP. 1200 RPM. Cr. Wh. 220/440/3/60 Ind.
1—75 HP. 1800 RPM. U. S. Line Start 220/440/3/60 Ind. B.B.
1—65 HP. 1200 RPM. G. E. type KT. 220/440/3/60 Ind.
1—40 HP. 900 RPM. Whse. type CW. 440/3/60 Slip Ring.
5—5 HP. 2200 RPM. Reliance Ex. Proof, 230 V. D.C.
Several Whse. type SK. 230 V. D.C.
5, 7½, 10 and 15 HP. New TEFC and standard open ball bearing AC motors available. Across line and reduced voltage starters.

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MOTOR GENERATOR SETS

1—150 KW. Ridgeway, 900 RPM, 250 V. DC to 225 HP. 2300 volt. Syn. motor AC, complete with control equipment.
1—200 KW. 900 RPM, 250 V. DC to 300HP, 2300/4000 volt, Syn. motor AC, complete with control equipment.

REBUILT MINING MACHINES

6—112 AA and 12 AA Goodman 250 Volts
1—112 G3A Goodman 222 Volts
2—12 A and 12 AB Goodman 250 Volts
4—CE 7 Sullivan A-C and D-C
2—7-B Sullivan 250 Volts

LOCOMOTIVES

1—6 ton Goodman Type 33 250 Volts
1—6 ton Goodman Type 30-13 250 Volts
2—6 ton Goodman Type 2600 250 Volts
1—8 ton Westinghouse Type 906L 250 Volts
1—6 ton GE Trolley and Battery combination
1—12 ton GE Ball Bearing 42" gauge 250 Volt

LOADING MACHINES

2—7 BU Jays 250 Volts 42" gauge
4—5 BU Jays 250 Volts 42" gauge

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12—Belted 360, 676, 870, 1000, 1300 ft.
12—Diesel 105, 315, 520, 676 & 1000 ft.
6—Electric 1300, 1500, 2200, 5000 ft.

CARS & LOCOMOTIVES:

100—50 ton cap. Gondolas.
35—50 ton cap. Flat Cars.
4—35 & 65 ton Diesel Locomotives.
6—10, 16, 20 & 30 ton Gas Locomotives.
150—8000 & 10000 gal. cap. Tank Cars.
20—12 yd. Std. ga. Steel Dump Cars.
1—50 ton G.E. Diesel Elec. Locomotive.

RUBBER CONVEYOR BELTS:

1000', 60", 600', 30", 300', 20", 1000', 42", 900', 48", 1450', 36", 1200', 24", 900', 18", 600', 16", 350', 14".

ELECTRIC LOCOMOTIVES:

15—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:

12—100, 150, 180 & 480 KW.

MINE LOADERS:

17—GD9, Elmco 21, Conway 20, 50, 60 & 75 and Sullivan HL3.

STEEL TANKS:

30—8000, 10,000 & 20,000 gallon capacity.

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16 yd. Elec. 160 ft. Boom Dragline.

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3'x8'—2 deck Vibrat. Screen	685.00
3'x8'—3 deck Vibrat. Screen	885.00
Stoker Coal Crusher	395.00
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15 Ton Truck Scale	450.00
20 Ton Truck Scale	510.00
5 Ton Tipple Scale	260.00

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Two Late Type 500 KW, 600 Volt, G. E. 1200 RPM Rotary Converters complete with transformers. These can be adapted to 250 KW, 275 Volts.

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4/0 Copper Rail Bonds 7 Inches Long.

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GOODMAN SHAKER CONVEYORS
3—Goodman G 20 Shaker Conveyors with 250 v. 20 HP motors, also Goodman #3 Duck Bills.

MINING MACHINES
35—B Jeffrey 250 v. Permissible, 7½' bar.
35—B Jeffrey 500 v. Permissible 7½' bar.
2—29 C Jeff 250 v. HP 250 v. 6' Bar, rebuilt.

STORAGE BATTERY LOCOMOTIVES
2—6 Ton G.E., permissible 36/44 Ga. HM 825 BB Motors, with Edison Batteries.
4 Ton 36" Ga. Atlas 2 BB Motors.
5½ Ton Type D Ironton, 42" Ga.
2—5½ Ton Ironton Type A, 36/42" Ga.

Haulage & Gathering Locomotives
13 Ton Westgh. 250 v. 36" or 40" Ga.
10 Ton Jeffrey MH 110, 250 v. 36/42" Ga.
8 Ton Goodman 9104C2 Permissible Gath. 500 v. 40/44" Ga.
3—50 Ton 600 v. Std. R.R. Ga.
3—6 Ton G. E. 250 v. HM 803 Motors, 36" Ga.

COAL CRUSHERS
18x24 and 18x30 New Scottdale dbl. roll.

Rotary Con. & MG Sets (3 ph. 60 cy.)
300 KW G.E. HC 12 Rotary 275 v. 6 ph.
300 KW West. 250 v.—432 HP 2300 v. 8 PF.
150 KW Ridgeway 275 v. 900 RPM dir. con. 225 HP.
100 KW West. 125 v.—150 HP 2300 Syn.
50 KW G.E. 125 v.—75 HP West. 220/440.
35 KW Cr. Wh. 250 v.—50 HP 220/440 v.
7½ KW Wooten 125 v.—10 HP Wooten Vert.
3—New 10 KW 125 v.—220/440/3/60.
15 KW Cr. Wh. 250—220/440/3/60.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
1400	West.	1200	Syn.	New 1 P.F.
1000	West.	1200	Syn.	New 8 P.F.
750	West.	1200	Syn.	New 7 P.F.
450	G. E.	257	S.R.	MT
400	G E.	514	S.R.	1-M
350	G. E.	900	S.R.	I-M
300	West.	1800	S.R.	CW
250	West.	277	S R.	CW 1314
225	West.	585	S.R.	MW
200	Cr. Wh.	505	S.R.	
200	G. E.	240	S.R.	MT 412
200	West.	350	S.R.	CW
100	West.	1750	S.R.	C-I
100	G. E.	500	S.R.	M 1-25-cy.
50	Cr. Wh.	505	S.C.	
50	West.	580	S.R.	CW 658 D
50	G.E.	900	S.R.	I-M
40	G.E.	900	S.R.	MTC
35	West.	870	S.C.	CS

HOISTS, CRANES & PUMPS
400 HP Vulcan conical drum Shaft Hoist driven by 400 HP G.E. slip ring 440/3/60 with rev. mag.
400 HP Vulcan Slope Hoist—AC Motor.
2—Fairmont Car Retarders.
10 Ton Larry Car 500/250 v. DC.
2—50/75 HP 2 drum Meade Morrison slope.
75 HP Ottomwa slop with AC Motor.
75 HP Vulcan 2 drum shaft, S.R. Motor.
40 HP Lidgerwood sgl. fr. drum geared to 40 HP G.E. slip ring 20/440 v. 3 ph. 60 cy. MTC. Rev.
30 HP Carlin double dr. fr. 13"x18"—5½" figs.
2 —1 Ton AC Monorail 220/3/60.
10 HP Link Belt Car Spotter AC Motor.
5 HP Lidgerwood 230 v. DC Room Hoist.
4—2720 GPM 85' Le Courtney Bronze fitted 10" Cent.
1—700 GPM 60' Wheeler Bronze Fitted 5" Cent.

DC MOTORS GENERATORS, 230/250 v.

HP	Make	Speed	Wdg.	Type
300	G. E.	400/600		DMC
200	Cr. Wh.	500	sh.	CM
175	G. E.	475	ser.	MD 109
130	G. E.	550	ser.	CO 1812
100	G.E.	480	ser.	MD 108
100 KW	West.	500	cp.	M
50	Northern	600	ser.	K
50	West.	565	cp.	SK 500 v.
50	West.	250/1000	sh.	SK
50	Reliance	1750	cp.	166 T
40	G E. (Vert)	1750	cp.	CD 93
40	Roth	1500		
35	Cr. Wh.	700	sh.	CM
35	Cr. Wh.	950	sh.	CM
25	West.	825	cp.	SK 113
20	West.	750		
20	West.	600	ser.	K6
15	West.	600	ser.	K5
15	West.	850	cp.	SK 93
15	Wh.	800	sh.	CM
15 (4)	C. Wh.	1400/1700	sh.	CM
13	West.(Enc.)	825	cp.	SK 113
10 (2)	G.E.	1750	sh.	CD
7½	G.E.	1750	sh.	RL

AIR COMPRESSORS
1200 cu. ft. 100# Worthington 2 stage Belted.
3—373 cu. ft. 100# Bury—AC Motors.
173 cu. ft. 100# Pres. Chic. Pneu. Belted
90 cu. ft. 100# Pres. Chic. Pneu. Belted.
75 cu. ft. 100# Chg. Pneu-AC Motor.

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New 230 v. DC Magnetic Cutler Hammer. Starters, 20, 25, 40, 50, 60, 75 & 100 HP.

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Electric Coal Drills, Mine Fans, Vibrating Screens, Electric Generators, Motors, etc.

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1—112 AA, 50 HP Goodman Universal machine, with or without truck.
1—CE-7 Sullivan with or without truck.

LOCOMOTIVES
1—GE. HM-827, 500 V., 44" ga.

SUBSTATIONS
1—Armature and stator for 150 KW Ridgeway.
8—Westinghouse 300 KW Rotary Converters, 6 phase, 60 cycle, 300 or 600 volt. DC. 500 Amps. 1200 RPM, complete with switchboard panels.
1—100-KW G.E. M-G set complete, 275 volt D.C. 2300 A.C.

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1—200 HP Lidgerwood Hoist.
3—50 HP All Steel Hoists.

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1—5 ft. Jeffrey dies. fan, new condition.
1—35-HP Cargo winch complete with 230 volt D.C. Motor.
1—100-HP. Reeves Natural gas engine with 62.5 KVA G.E. alternator, 220 volt with complete switchboard equipment.
1—400-Amp. Lincoln welding machine with D.C. drive, 230 volt.
2—500 volt Goodman 212-AA cutting machine armatures.

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ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"
42"	5	1/8" — 1/16"
36"	6	1/8" — 1/16"
30"	6	1/8" — 1/16"
30"	5	1/8" — 1/16"
26"	5	1/8" — 1/32"
24"	5	1/8" — 1/32"
24"	4	1/8" — 1/32"
20"	5	1/8" — 1/32"
20"	4	1/8" — 1/32"
18"	4	1/8" — 1/32"
16"	4	1/8" — 1/32"
14"	4	1/16" — 1/32"
12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

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TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
Inquire For Prices — Mention Size and Lengths.	18"	6	10"	6	6"	5
	16"	6	10"	5	5"	5
	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
	12"	5	6"	6	3"	4

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"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

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FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

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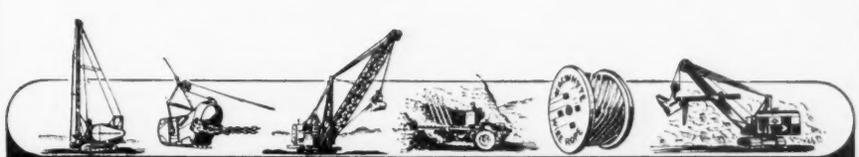
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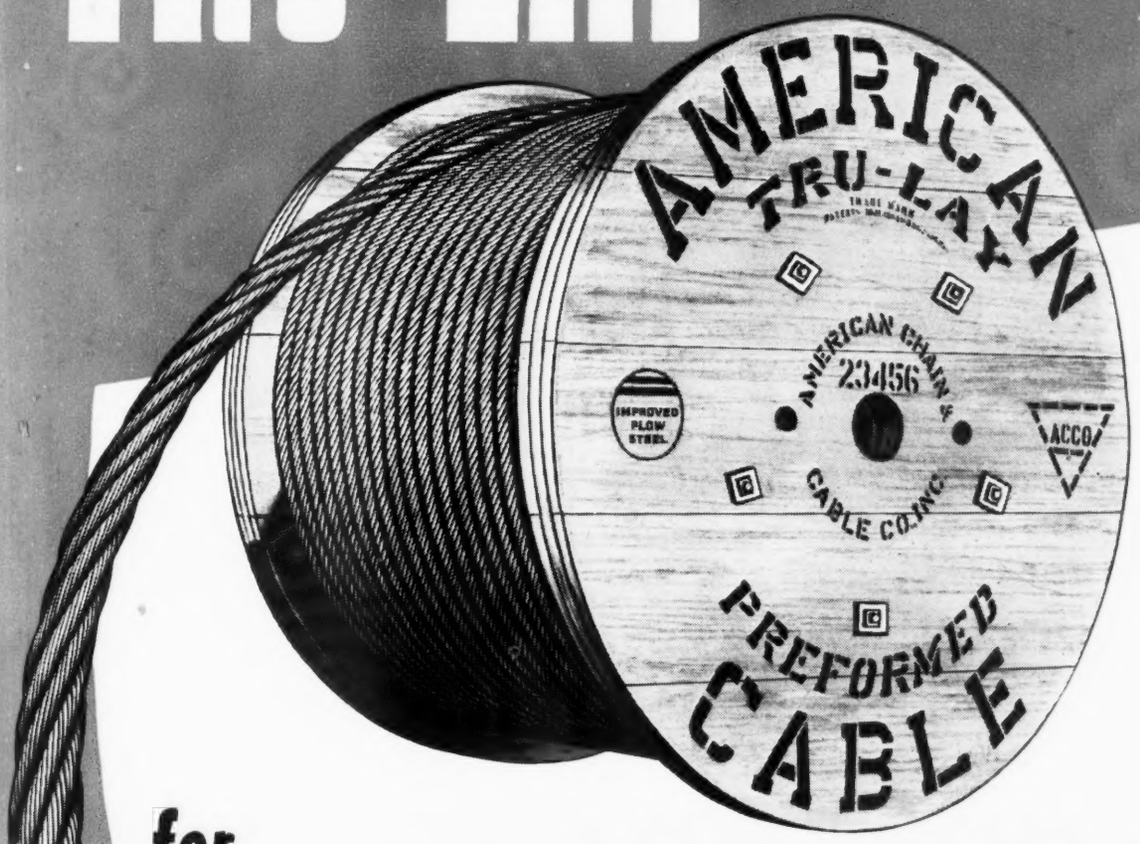
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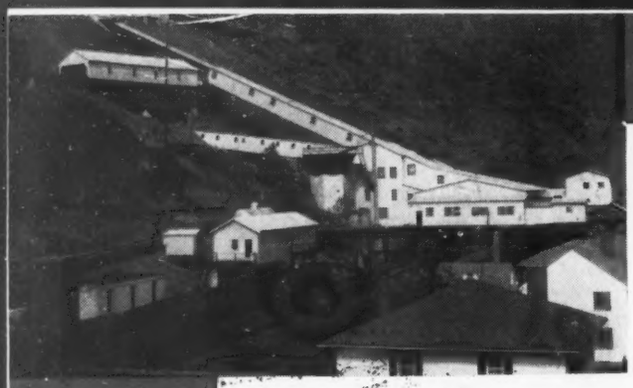
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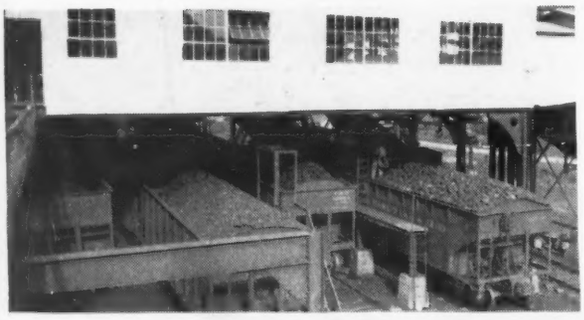


Above and at right: Preparation plant and flow sheet of The Guyan Eagle Coal Company, Amherstdale, W. Va. Below: Link-Belt Air-Pulsated washer. Bottom picture: Coal being loaded.

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as a coal problem solutio





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